THE FINNISH ENVIRONMENT 17 | 2009

ENVIRONMENTAL PROTECTION

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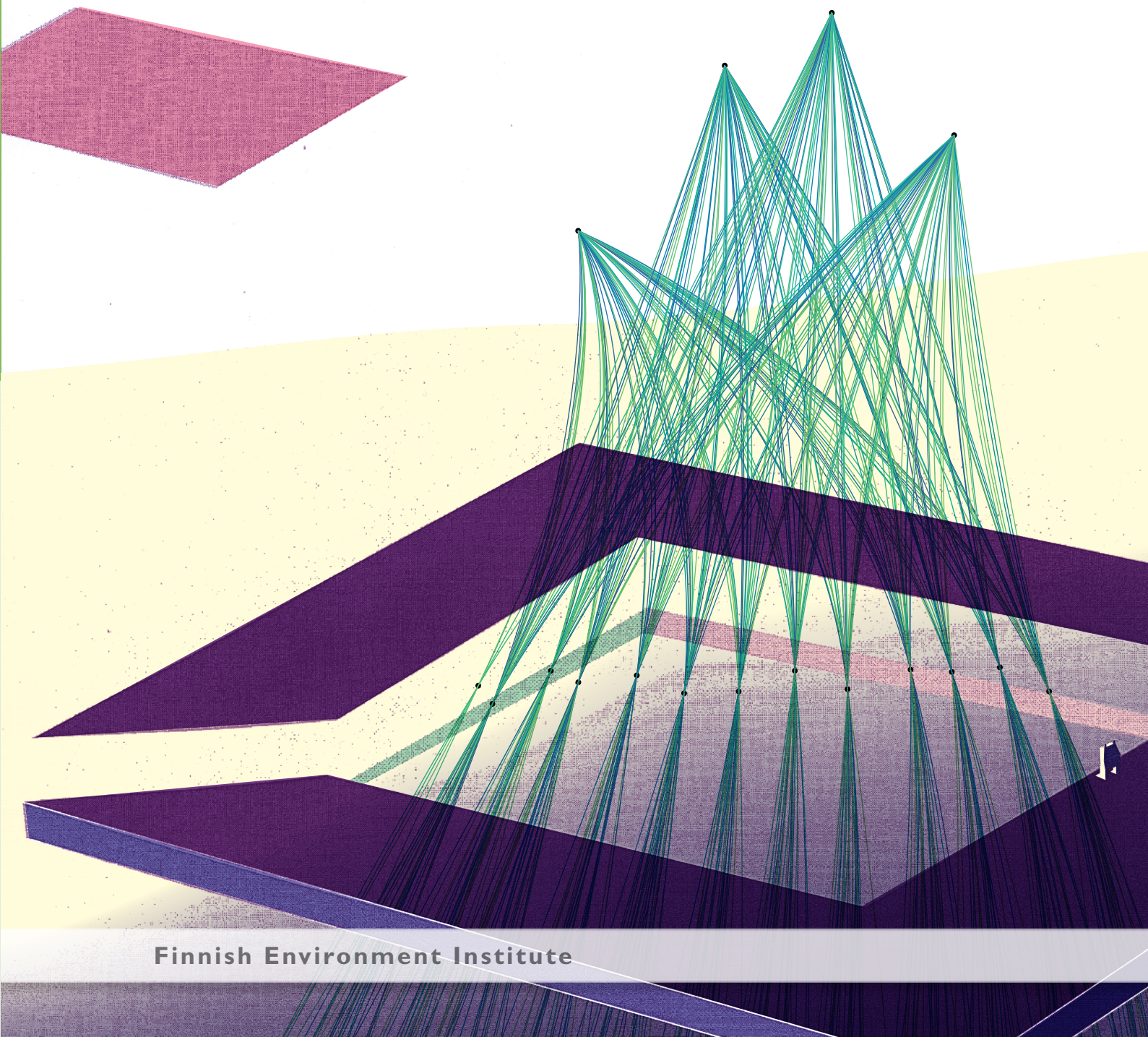
Case: bioenergy-biodiversity interlinkages

Eeva Furman, Taru Peltola, Riku Varjopuro (editors)



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Helsinki 2009

FINNISH ENVIRONMENT INSTITUTE

THE FINNISH ENVIRONMENT 17 | 2009
Finnish Environment Institute
Research Department

Layout: Seija Turunen
Cover: Jonatan Hildén

The publication is also available on the internet:
www.environment.fi/publications

Edita Prima Ltd, Helsinki 2009

ISBN 978-952-11-3483-8 (pbk.)
ISBN 978-952-11-3484-5 (PDF)
ISSN 1238-7312 (print.)
ISSN 1796-1637 (online)

PREFACE

The processes behind ecosystem goods and services ensuring our well-being are today more severely disturbed than ever before. Wise decision-making and political will are challenged by complexity, unexpected and indirect interlinkages, feedback loops and time lags. There is a great demand for knowledge that provides synthesized analyses of alternative paths and potential nonlinearities in the socio-ecological systems. These analyses may enable the development of effective and reflexive policies, facilitate successful innovations and enhance sustainable individual decisions.

The complexity and interconnectedness of humanity and the rest of the nature require that knowledge is produced through interdisciplinary collaboration and in close connection with other stakeholders and research users. Due to path dependencies of research traditions within single disciplines, interdisciplinary collaboration requires facilitation with new and cost-effective tools.

The European-wide long-term biodiversity research network, the ALTER-Net, has facilitated interdisciplinary research practices and developed an interdisciplinary research framework for providing syntheses and identifying research needs for emerging research needs for biodiversity governance.

Firstly, we have analysed how ALTER-Net as an example of a large research network with interdisciplinarity as its general goal has fostered integration between disciplines, teams and institutions. Secondly, we have tested the practical application of an interdisciplinary research framework developed through the network, by using bioenergy/biodiversity interlinkages as a pilot. The research needs for bioenergy/biodiversity interlinkages identified in the pilot are documented in this report.

Our report provides the reader a journey through the evolution of interdisciplinary research within the research network, a remarkable method that distils a handful of sophisticated interdisciplinary research plans from hundreds of spontaneous ideas. It offers the European biodiversity research community a broad framework for knowledge production which captures novel signals by bringing researchers, research users and other stakeholders together to contribute. This framework catalyses research most urgently needed for decisions that drive towards sustainability.

Eeva Furman, Taru Peltola, Riku Varjopuro

CONTENTS

1 Introduction

Author: Eeva Furman[1]

Human society manages biodiversity through hundreds of regulatory instruments on the local, national, regional and global levels. Despite this, the trends observed in the state of biodiversity signal ineffective conservation. Criticism is directed at policies and other institutions of conservation, at management practices linked to them, and at the neglect of biodiversity conservation in societal functions at large. This characterizes the challenges that biodiversity and its conservation face: ecological issues closely linked with social, economic and cultural issues need to be understood and incorporated when planning conservation approaches (EC 2006).

The intertwining of ecological, social, cultural and economic issues sets special requirements on the knowledge that various disciplines produce and translate. Due to the fact that disciplines have different approaches and ways of framing research questions, the use of various outputs from disciplinary research is not easy for policy makers or managers to comprehend. Therefore, holistic assessments and understanding of biodiversity challenges, as well as the processes and mechanisms linked to them at different scales, are needed. This not only requires collaboration between the various disciplines, but collaboration at various stages of research between researchers and stakeholders, on the one hand, and researchers and users of knowledge, on the other, to enhance the applicability and relevance of scientific knowledge.

Carrying out interdisciplinary research is premised on using and combining various methods and concepts, as well as modes of communication. The framing of the research question determines which elements are going to be under scrutiny. This influences what empirical material is needed for the research and what are the potential uses of the research outcomes. Therefore, using the expertise of various disciplines and stakeholder groups is crucial for the identification and framing of knowledge needs for complex issues.

Various approaches have been developed to bring researchers from different fields, stakeholder groups and scientific knowledge users together. Depending on contexts and settings (level, site, time), specific requirements are established to ensure the optimal efficacy of the approaches and their applications. Therefore, such an integrated interdisciplinary research process has to be carefully tailored to suit the topic which is under scrutiny as well as the institutional and scientific backgrounds of the participating actors.

The Lisbon Strategy links societal competitiveness and innovativeness with research competitiveness. It has been one of the key underlying drivers for the European Commission to fund and direct the research performed under ALTER-Net, a Network of Excellence of the EC 6th Framework Programme on long-term biodiversity research

[1] SYKE

in Europe, carried out during the years 2007–2009. Among the programme's main goals are building durable integration between its partner institutions from the EC member states, developing infrastructure for long-term biodiversity research and providing problem-oriented mechanisms and tools to facilitate policymaking and management of biodiversity conservation using research from various disciplines.

In this report, we describe why and how interdisciplinarity evolved in the ALTER-Net project, culminating in the interdisciplinary research framework for ALTER-Net (IDR framework). The IDR framework presents a method to explore research topics and develop them further as interdisciplinary research projects. The report depicts the development of and choices leading to the IDR framework to provide context for the search of interdisciplinary processes and planning of research. There is an extensive body of literature on the needs, benefits and challenges of interdisciplinary research (briefly reviewed in chapter 2). This report contributes to that discussion by offering a narrative of how this kind of collaboration between disciplines was sought and finally actualised in the application of a practical model for scoping research topics and developing them into research projects.

The narrative points out the important steps in the application of methods for enhancing collaboration between researchers from different disciplinary backgrounds as well as stakeholders from outside the research arena. First, an interdisciplinary framework model was created. Second, the model was piloted by focussing on the topic, bioenergy/biodiversity interlinkages. The pilot process (BE/BD pilot) utilized the DPSIR (Drivers-Pressures-Status-Impacts-Response)-approach (EEA 1995) and developed methods for facilitating interdisciplinary dialogue and identification of emerging research needs related to bioenergy and biodiversity. Based on the pilot, the framework has been further developed for ALTER-Net II to identify the interdisciplinary research needs in topics raised by the ALTER-Net Council, the EC or any other actor in biodiversity conservation.

List of Abbreviations and Acronyms

BE/BD pilot	IDR framework pilot on research needs arising from bioenergy and biodiversity linkages
DPSIR	A conceptual approach examining the drivers of environmental change; environmental pressures; state of the environment; societal, economic and environmental impacts; and societal response
IDR framework	Interdisciplinary research framework for ALTER-Net
IDR plan	Interdisciplinary research-enhancing plan within ALTER-Net
LTER Europe	Long-term ecological research network for Europe
LTSER platform	Long-term socio-ecological research platform within LTER
WP	Work package, a structural unit of the ALTER-Net project

This report has been produced by the team which contributed to the planning, implementing and analyzing of the IDR framework or its BE/BD pilot[2]. The report also incorporates results from an assessment on integration in the ALTER-Net network to bring further insight into the evolution of interdisciplinarity. The assessment focussed on integration in various dimensions by asking: how ALTER-Net partners are working together; what forms of collaboration between work packages (WPs) have emerged;

[2] Eeva Furman, leader of WP R4 (conservation options), overarching Goal 3 on management tools and IDR priority area 4 has been responsible for the planning and implemenation of the IDR framework. Taru Peltola as BE/BD pilot task force leader,has been responsible for all activities connected to the BE/BD-pilot. Task force members who have contributed to this report include Rob van Apeldoorn (Alterra), Vineta Goba (ECNC), Zita Izakovicova (ILE-SAS) and Julia K. Steinberger (IFF). Janne Rinne carried out a desk study for the BE/BD-pilot.

and how interdisciplinarity has developed over the years[3]. All these dimensions of integration are relevant for building the interdisciplinary research framework.

This report is structured around nine major chapters. After this introduction, the theoretical background for interdisciplinary research is discussed in chapter 2. Chapter 3 presents the role and practices of interdisciplinarity within ALTER-Net. The development of the IDR framework and the BE/BD pilot are described in chapters 4 and 5. Chapter 6 presents an account of the method used for facilitating interdisciplinary dialogue. Chapter 7 summarizes the results of the bioenergy-biodiversity topic as outcomes of various ALTER-Net interdisciplinary activities, including the BE/BD pilot. In concluding the report, chapters 8 and 9 evaluate the process of developing the IDR framework through the BE/BD pilot, discuss the lessons learned and present potential of the IDR framework in a broader framework for knowledge production and transfer.

[3] The assessment conducted by Riku Varjopuro and Marja-Leena Kosola used the development of the IDR framework and the BE/BD pilot as one 'case' of integration.

2 Interdisciplinarity: theoretical debates and challenges

Authors: Taru Peltola and Riku Varjopuro[4]

The development of the IDR framework relies on the notion that to facilitate interdisciplinary communication we need tools to overcome practical, institutional, cognitive and cultural barriers (McCallin 2006; Uiterkamp and Vlek 2007; Corley, Boardman and Bozeman 2006). Despite the general emphasis on interdiciplinarity in research funding, for example, genuinely interdisciplinary work is rare (Petts et al. 2007). Unsurprisingly, disciplining knowledge production is often addressed as an obstacle for interdisciplinarity: historically formed institutions, conceptual frames and technologies of inquiry create epistemological and ontological commitments and structure interaction between researchers. As these intellectual and practical commitments and structures direct scientific work, they may prevent possibilities for collaboration.

While the need for integration of various kinds of knowledge and scientific approaches is acknowledged, interdisciplinarity of research itself can be understood in many ways. Traditionally, interdisciplinarity has been divided into three different categories according to the level of scientific integration promoted: multidisciplinary, interdisciplinary and transdisciplinary research.

Multidisciplinary research forms the most elementary level of interdisciplinarity. In such an approach, a commonly identified problem is studied from different disciplinary viewpoints, based on the assumption that we can find solutions to complex problems by linking together fragmented analyses that are formulated upon separate problem definitions and methodologies (Uiterkamp and Vlek 2007). The proponents of more integrative approaches, however, point out that complex phenomena can rarely be understood by breaking them down into singly analysed parts (Bruun and Toppinen 2004). Therefore, it is recommended that interdisciplinarity aim for collaboration between scientists with distinctive cognitive, epistemological and methodological perspectives. In this way, we move to a truly interdisciplinary collaboration that is characterized by a process involving the merging of concepts, models and methods (Uiterkamp and Vlek 2007). In other words, interdisciplinary collaboration starts a process of disciplinary integration, whereas multidisciplinary work mainly addresses communication and interchange between disciplines.

The third level of integration, transdisciplinarity, is promoted by those who acknowledge the limits of scientific knowledge production in resolving complex problems, and seek to integrate scientific and non-scientific knowledge (Uiterkamp and Vlek 2007). Some scholars give slightly different interpretations to the three categories. For instance, Mitchell (2005) sees the merging of disciplinary approaches as characterizing transdisciplinary collaboration – as in interdisciplinarity described

[4] SYKE

above. However, that perspective precludes the important viewpoint of the possibility for collaboration between scientific and non-scientific stakeholders. After all, as King *et al.* (2008) have observed, the most lasting influence of research comes not from information transferred to practitioners, but from practitioners and researchers co-creating knowledge.

In developing the IDR framework for ALTER-Net, we did not have any preferences for the aforementioned types of interdisciplinarity to avoid a simplistic and unproblematic approach to scientific integration. Instead, we wanted to explore and find ways to overcome the problems related to each of the versions of interdisciplinarity and to avoid imposing any set frames or roles to the different sciences. Perhaps the only strong commitment we made was allowing non-scientific stakeholders a role in developing the research questions and approaches.

One of the problems identified with interdisciplinary research is the roles assumed by the different sciences. Endter-Wada *et al*. (1998) have emphasized that the issue of integration raises questions about the division of labour between the sciences. Social scientists' expertise is seen to be restricted to political processes only: for example, to how people think about biodiversity and how they understand the goals of biodiversity management. At worst, the role of the social scientist is reduced to a means of smoothing the way to technical and scientific solutions, relevant only when social science can be used to explore the attitudes or values of recipients, when it deals with participation and brings in data on people's opinions as well as communicates scientific knowledge to lay people. Other possible contributions, defined by social scientists themselves, are largely neglected, making them argue that when problems are pre-framed as technical or physical, little room is left for understanding the social complexity of the problems.

In addition to the different roles between the social and natural sciences, attention should be paid to the fact that neither science is a unified whole. As has been pointed out by Karin Knorr Cetina (1999), even within a singular discipline, such as physics or ecology, the acts, strategies and policies of knowing are culturally diverse. Such diversity makes communicating at the intradisciplinary level challenging as it is, let alone at the interdisciplinary level.

Also problems of transdisciplinarity have been discussed at length, especially through debates on public understanding of science and participation in knowledge production. Although biodiversity, for example, has been mostly a professional project dependent on scientific accounts of nature, it has been acknowledged that the task of "knowing nature" is so vast and the resources of science-based management so limited, that there is a need for other non-scientific sources of knowledge (e.g., Ellis & Waterton 2004). This need has taken the form of naturalists' or other amateurs' knowledge, such as fishermen's knowledge, being considered a significant contribution to the sciences.

These attempts have not been without problems. Ellis & Waterton (2004) and Kaljonen (2008) report, for example, how part of naturalists' or farmers' knowledge about biodiversity is lost in the process of being utilized in official processes. This sometimes leads to situations, in which the commitment of non-scientific parties is reduced.

As the goal of this process was to come up with a framework for problem- oriented interdisciplinary research capable of addressing and taking ownership of emerging research needs, the emphasis in the pilot was given to finding proper working methods to connect methodological perspectives rather than bridging textbook codes of science (ideas and histories of ideas, knowledge claims and theories) and disciplines as institutions (see Knorr Cetina 1999, Bruun & Toppinen 2004).

3 ALTER-Net as an evolving platform towards interdisciplinary research

Authors: Eeva Furman and Riku Varjopuro[5]

The explicit goal of the Alter-Net project was durable integration of biodiversity research activities in Europe. The project summary of the ALTER-Net Description of Work offers the following rationale for disciplinary integration, a key dimension of integration that was sought from the very beginning:

This Network of Excellence (NoE) will create a European long-term inter-disciplinary facility for research on the complex relationship between ecosystems, biodiversity and society.

When ALTER-Net was planned and initiated in 2004, it was built around a grid structure with six research-oriented work packages, six integrating work packages and two spread of excellence work packages (training–mobility and communication–dissemination activities) as well as a management component (fig. 1). The WP leaders formed a management board to carry out decisions around the operational implementation, while each institute nominated an operational leader within their institute. The ALTER-Net Council, being the strategic decision-making body of ALTER-Net, consisted of high-level representatives from each institute. The ALTER-Net Advisory Board, formed to build a link between conservation and research, was represented by key stakeholders from various international conservation institutions[6]. The European Commission's directorate general for research, which channelled 10 million euros of financing into the project, monitored the development of the project, particularly its successes in terms of meeting its objectives, and carried out a process of yearly evaluation.

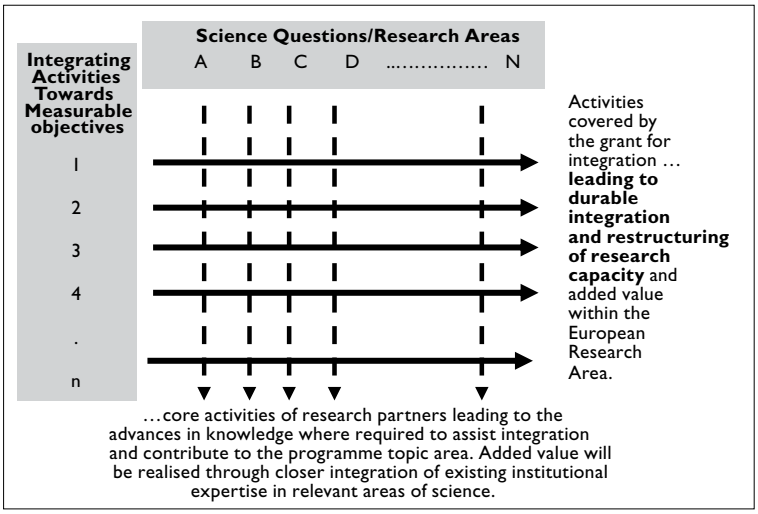

Fig. 1 Conceptual diagram showing the relationship between the integrating activities and research areas. Research areas will provide the knowledge needed for durable integration.

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[6] Birdlife International; EC DG Research; EEA; REC SEE; DIVERSITAS; OECD; UNECE-CLRTAP; ETC/BD; UNEP-SCBD; UNEP-WCMC; GBIF; EC JRC; UNESCO; EPBRS; Agency for Nature Conservation, Czech Republic.

The organisation of activities through WPs structured the possibilities for interdisciplinary research. Most WPs operated individually having a leader and deputy leader and an active team consisting of 5–20 persons from various partner institutes. It was observed in the ALTER-Net integration assessment (see annex 6) that WPs had different strategies to approach their main tasks. Many WPs designated smaller task forces to carry out clearly defined tasks that were approached from a rather narrow disciplinary focus. The interdisciplinary exchange, if it was taken as an explicit goal at all, was then actualised in an interchange between the task forces. Some WPs worked mainly as one group, which allowed for more long-lasting opportunities for interdisciplinary exchange.

Over the years, not only have WP-specific working cultures evolved, but the objectives to be reached have become more concrete. These developments occured naturally hand in hand in a process in which the WPs wanted concrete content for their objectives and at the same time, to find ways to make the group work together. For each WP, working together effectively was a real achievement since each consisted of individuals from various disciplinary backgrounds and countries, the majority not having worked together before. WPs acted on their own in defining their task; none of them had a clear methodological approach for identifying common research topics. The framework presented in this report is a suggestion of how to proceed more efficiently in generating interdisciplinary research topics.

It should be noted that in the beginning ALTER-Net used a top-down approach, as the objectives for WPs were defined by the team (not always including the WP leader) that prepared the proposal. Only following this, were the actual content and forms of collaboration built by each WP in a bottom-up mode within the given frame. This process took the work of different WPs in different directions, not leaving much space for joint activities such as joint planning or research. There were, however, instances of good collaboration that emerged when some WPs realized that they needed information that only another WP could provide. The links to other WPs were thus enhanced, through concrete information input or in some cases, methods needs. As each WP worked quite independently from other WPs, time became an inhibiting factor, cutting short opportunities to effectively collaborate between WPs. In many cases, WPs found themselves not ready to give their input when other WPs needed it. Also, the connections between the research and integrating activities did not develop into close collaboration, as each WP felt compelled to achieve their own internal objectives, to begin with.

Cohesion between WPs was strived for by having management board meetings 3-4 times per year, through joint workshops, bringing together more than one WP, newsletters and the ALTER-Net extranet, known as Lynx. WP leaders found the management board a crucial forum for WP interchange. Nonetheless, interchange within the management board was insufficient to reach the goal for research integration that the European Commission endeavoured. The direction ALTER-Net was heading in, due to its complex grid structure with 13 separate activities, was pinpointed as a problem by the Commission and consequently, an emergency meeting with the ALTER-Net management board was called in Brussels in February 2006. At the meeting, three alternative organisational structures were presented by the ALTER-Net coordinator; upon the Commission's recommendation, ALTER-Net chose one consisting of an umbrella structure with four overarching goals towards which WPs could collectively direct their efforts. This recommendation was discussed and further developed by the management board at its meeting held in June 2006, and finally presented to the ALTER-Net Council, whose approval was finally granted in the autumn of 2007.

The four overarching goals selected for the final two years of ALTER-Net are as follows:

Goal 1: Pan-European framework for understanding and quantifying the main drivers and pressures for change

Goal 2: Pan-European research and monitoring framework for improved biodiversity indicators

Goal 3: Methods, tools and policies for improvement and cost-effective management of biodiversity

Goal 4: A design for a "Biodiversity Observation and Research Network".

When the fourth annual ALTER-Net work plan was developed in 2006, the overarching goals were already implemented and in operation. Resources were allocated through the four goals as decided at the management board meeting in June 2006, with the division of resources planned though a brainstorming and voting exercise within the management board. Finally, resources were allocated to the traditional WPs according to their interests, in order to contribute towards a variety of goals through clear definition of WP activities and end products. Most activities remained on WP level, while some were exchanged among WPs. One WP activity, in particular, explicitly took onboard the challenge of interdisciplinary collaboration – it aimed at finding interdisciplinary interfaces between the activities of all WPs. This WP activity, marking the development of an IDR framework for ALTER-Net, will be the main focus of this report.

The reception of the overarching goals was not altogether positive as they were perceived as being too abstract and even distracting in relation to activities taking place on the level of individual WPs. For example, the need for interdisciplinary research was called into question during June 2006 discussions on how to practically apply the third goal, 'methods, tools and policies for improvement and cost-effective management of biodiversity'. It was, however, seen as necessary, as ALTER-Net was structured around the DPSIR approach (EEA 1995) which again leans towards interdisciplinarity. 'Durable approaches for interdisciplinary research' was finally selected by the Council as one of the four priority areas of ALTER-Net during its final two years as a project and beyond. Under this priority area, a main task was to develop a plan for the enhancement of interdisciplinarity within ALTER-Net. The process of disciplinary and institutional integration was analysed through a separate ALTER-Net activity, a summary of which is presented in annex 6.

4 Enhancing interdisciplinary research within ALTER-Net

Author: Eeva Furman[7]

4.1

The evolution of the interdisciplinary approach

The work continued around so called activities, which refers to research but also to work where structures, processes and methods for future collaboration are developed. The plan for enhancing interdisciplinary research within ALTER-Net (IDR plan) was structured around three elements: the carrying out of broad interdisciplinary activities to develop ALTER-Net's interdisciplinary research capacity; team writing of high impact papers to demonstrate ALTER-Net's improved biodiversity research capability; and the organising of various forms of joint meetings, such as regular tele-meetings between activity leaders to enhance and monitor the implementation of the plan and a mid-term joint workshop covering all interdisciplinary activities. (for IDR plan, see annex 1). A special section of Lynx featured the IDR plan.

The plan's main operational tool was the tele-meeting between activity leaders, six of which were held between May 2007 and December 2008. At the meetings, the progress of each activity was discussed in detail. One of the major tasks of the leaders of the activities in the IDR plan was to develop a draft Annex on Interdisciplinary Research to accompany ALTER-Net II's Memorandum of Understanding (see annex 2). At a fairly early stage, organizing a mid-term joint workshop became the main joint activity, and the workshop finally materialized in October 2008 in Edinburgh. The workshop brought together 38 participants from 11 ALTER -Net WPs and one participant from the Network Advisory Board. All the broad activities and many of the more focussed activities were presented and discussed as were the four shared topics: 1) potential for multidisciplinary/interdisciplinary/integrated research in ALTER-Net; 2) links from ALTER-Net IDR to the LTSER component of LTER Europe; 3) potential for a nature and society journal for Europe; and 4) a future framework for IDR in ALTER-Net.

In the IDR plan, the broadest of the broad activities was the development of the IDR framework, aimed at developing capacity for interdisciplinary syntheses together with stakeholder participation.

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4.2

Applying the goal in practice: selecting a framework to be tested

The topic of IDR and progress of activities were discussed in tele-meetings over an 18–month period, but also from the very beginning the practical methods to enhance interdisciplinary collaboration were addressed. The leader of the IDR plan invited all WP leaders and other individuals at ALTER-Net partner institutes who had indicated interest in the interdisciplinary research collaboration to a tele-meeting. This first meeting (on 23 May 2007) addressed the piloting of ALTER-Net's capacity to develop interdisciplinary syntheses, and aimed at deciding on a substantive topic which could be of interest to both researchers and end users. The piloting was deemed to require a variety of action from several WPs, including:

- determining how the topic links with WP objectives
- providing knowledge already gained in the WP that could assist in developing the plan
- taking part in decision-making regarding problem orientation, and developing the plan as part of an interdisciplinary team, in close collaboration with stakeholders on the international, national and LTSER levels

There was some low buy-in of the idea of running the pilot; some WP leaders had their work packages ready and agendas set for the coming years and were not necessarily interested in taking up additional tasks and overburdening their team members. The WPs of each discipline also felt uncomfortable in entering into an interdisciplinary exercise, especially when they had not taken part in its planning at the early stages. However, before the tele-meeting came to a close, enough support was received for undertaking the pilot, and the discussion turned to the selection of a substantive topic.

Various topics were suggested by the participants of the tele-meeting and finally four topics were chosen to be voted on. As not all WP leaders were present at the tele-meeting and as some wanted to discuss the alternatives within their WP, the decision on the topic was postponed for a week and followed up on via email, with most WP leaders and some WP communities responding within the given time period. The voting outcomes are summarized in table 1.

Table 1. Rankings by work packages of the following suggested topics: 1) climate change-induced land use changes; 2) climate change-induced bioenergy policies and practices; 3) changes in agriculture and associated reasons; and 4) Natura2000 network as a tool for sustainability

Work package	Ranking order of the suggested topics
RA1: socio-economic drivers	2 1 3
RA2: assessment of change	No suggestions
RA3: natural/anthropogenic drivers and pressures	4, 3, 1, 2
RA4: conservation options	2 4
RA5: attitudes	2 4 1
RA6: forecasting change	1 4
I1: distributed institute	No suggestions
I2: integrated research	1 3 4
I3: LTER	2
I4: science-society	No suggestions
I5: science policy	No suggestions
I6: information management	1 4 3 2
E1: training & mobility	No suggestions
E2: communication and dissemination	No suggestions

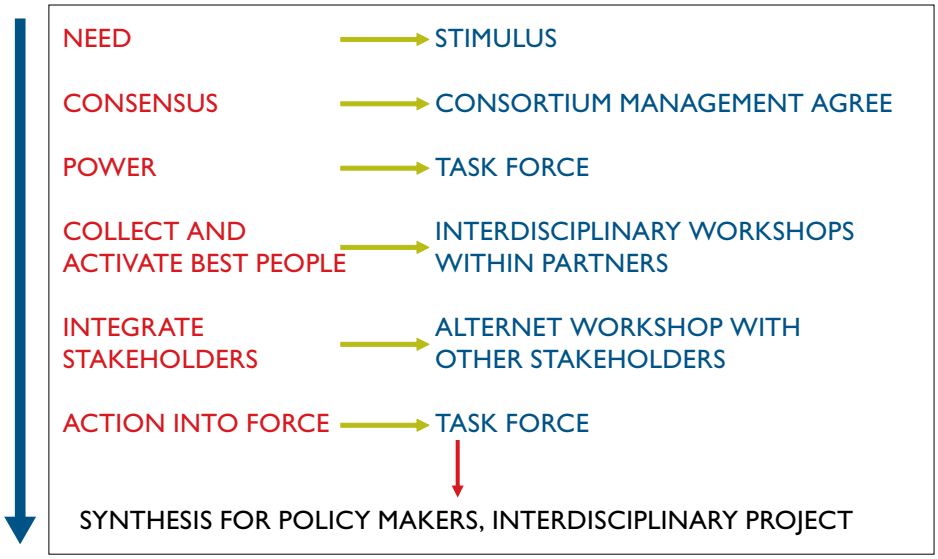
Although the rankings were very diverse, there was convergence of opinion with regard to the bioenergy-related topic (topic 2), which received the most support and therefore, selected for the pilot. WP RA4, dealing with future conservation options, was the most interdisciplinary of the WPs and had as one of its objectives to tackle the knowledge gaps in decision-making; hence this WP was asked to take the lead on the piloting. This was also a practical solution, as overarching goal 3 (*Methods, tools and policies for improvement and cost-effective management of biodiversity),* the priority area 4 *(Durable approaches for inter-disciplinary research)* as well as WP RA4 (*Conservation options)* were all led by the same person.

4.3

The framework testing pilot

At a meeting in Brussels on 31 May 2007, the WP RA4 came up with a conceptual model for the IDR framework (table 2). A general aim of the framework was to foster an interdisciplinary community capable of carrying out interdisciplinary analyses that tackle European-wide problems in halting the loss of biodiversity.

Table 2. The IDR framework model builds on the actions, power and empowerment of stakeholders and researchers from various disciplinary backgrounds, and, functions on the basis of a strong communication component.



The meeting also provided the opportunity to plan the further development of the theoretical model of the framework as a practical tool to be applied in the BE/BD pilot and evaluation of the process; ways to communicate the valuable knowledge gained on the bioenergy-biodiversity interlinkages was also discussed at the meeting. The plan for the process was formulated as follows:

1. Define the problem.
   - form a task force, led by goal leader and facilitated by RA4-team; members to also include representatives from other WPs
   - task force defines the problem by using other WP researchers as needed
2. Identify knowledge needs and research questions to be tackled.
   - organise a stakeholder workshop to discuss the problem and to identify knowledge needs
   - the stakeholder group consists of representatives from the local, national and EC levels with different expertise and a mix of nationalities
3. Re-define the problem and research questions.
   - task force re-defines the problem and research questions
   - a workshop involving a range of WPs and disciplines is organised to develop the research plan, scan existing data and identify the needs of ALTER- Net partners
4. Develop the interdisciplinary research plan.
   - task force develops the research plan further
   - second stakeholder meeting is held with the same stakeholders to present and discuss the research plan
5. Finalise the research plan.
   - the task force finalises the research plan
6. Analyse the process of developing the research plan.
   - the process of developing the plan is analysed all through the process; its outcomes are separately synthesized by RA4 from the task force
7. Develop a practical framework from the analysis for the purpose of planning interdisciplinary research within ALTER-Net.
8. Provide a synthesis of the outcomes from various interdisciplinary activities carried out under separate WPs, including a compilation of experiences.

The responsibility of leading the pilot was shared by SYKE and CEH[8]. The process was initiated in 2007 but the active phase of the pilot ran from December 2007 to March 2009 when this report was finalised.

A task force consisting of eight members from various ALTER-Net partner organisations was formed by getting all WP leaders to identify a person interested in the work. The task force was provided with the preliminary plan as a guiding document but the team was given the right to alter the plan within the budget framework allocated towards the piloting activity. The task force was requested to report on any progress made to the IDR leader and the other activity leaders during regular tele-meetings and were offered supervision whenever needed. Two

[8] For SYKE, Eeva Furman was responsible for the entire process and led the implementation of the IDR plan and related meeting activities. Mikael Hildén contributed to the initial development of the broader plan of ALTER-Net interdisciplinary research, while Taru Peltola undertook the responsibility of leading the task force in the carrying out of the bioenergy pilot. Riku Varjopuro led the evaluation of the integration within ALTER-Net, and in particular ,within the IDR and piloting processes. For CEH (Centre for Ecology and Hydrology), Terry Parr and Allan Watt contributed as ALTER-Net coordinators in tele-meetings and the Edinburgh meeting; they requested that SYKE carries out the evaluation on ALTER-Net integration (see Annex VI) as a way of keeping track of the progress made. Also for CEH, Nicola Thompson and Andrew Sier ensured the functioning of the technical linkages between ALTER-Net partners and activities.

individuals, Janne Rinne and Janne Heliölä (SYKE), were commissioned to provide practical support to the task force in terms of carrying out a survey, collecting and synthesizing information from scientific and other sources as well as in organizing workshops and developing web-pages for the BE/BD pilot.

During the five–year project period ALTER-Net strived to evolve from a traditional project with a general acknowledgment of the importance of interdisciplinary research as its goal to an active interdisciplinary network with tools and approaches to activate and foster its research community to carry out interdisciplinary research and integrate stakeholders in its activities (see fig. 2).

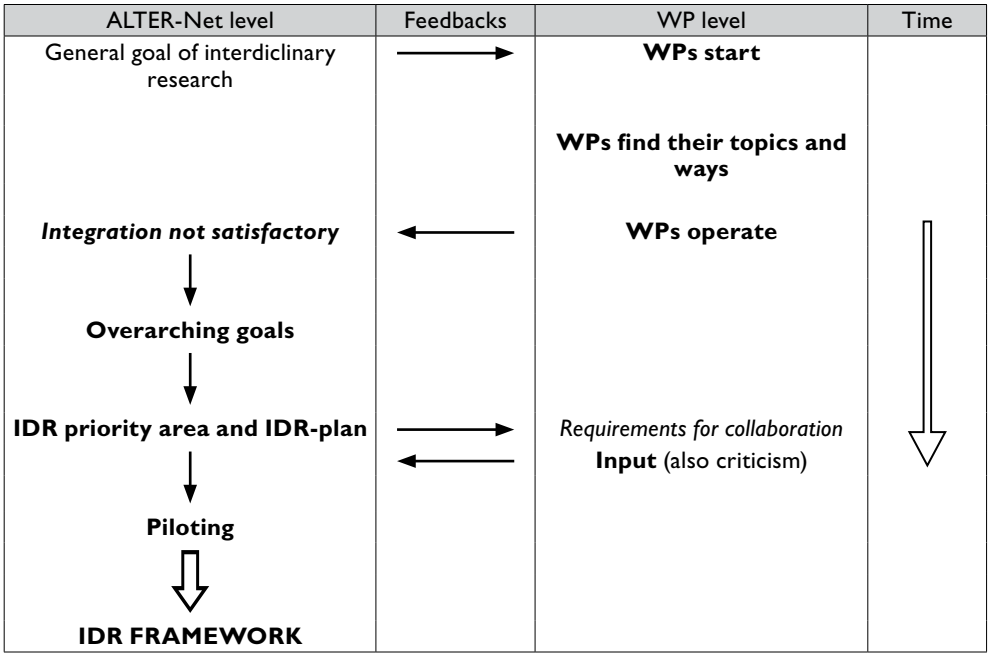


Fig. 2 Summary of the development of the IDR framework, as part of ALTER-Net networking activities.

5 Testing the IDR framework using the bioenergy/biodiversity pilot

Authors: Taru Peltola[9], Rob van Apeldoorn[10], Vineta Goba[11], Zita Izakovicova[12], Julia K. Steinberger[13]

The previous chapters presented how interdisciplinary research became a topic in ALTER-Net and the different efforts that were undertaken to make it operational. The process resulted in a serious attempt to pilot the interdisciplinary planning of research. This chapter focusses on the pilot phase itself.

Piloting the interdisciplinary framework included several steps and activities coordinated by the task force. The main actions, to be presently discussed in detail, consisted of:

1. Forming the Task Force
2. Setting concrete aims and planning the activity
3. Collecting material: identifying literature and experts
4. Communicating through the webpage
5. Holding workshops and follow-up activities: Helsinki workshop March 2008; Edinburgh workshop, October 2008; LTER Europe conference, Mallorca, December 2008; Vienna meeting, February 2009; Leipzig conference, March 2009

5.1

The BE/BD pilot task force

The piloting activity was coordinated by a task force with members invited from seven ALTER-Net partner organisations and sixWPs[14]. The task force did not meet face-to-face until October 2008; instead it held five skype/tele-meetings and otherwise communicated by e-mail.

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[9] SYKE

[10] Alterra

[11] ECNC

[12] SAVBA

[13] IFF

[14] The leader of the task force was Taru Peltola (SYKE). Other members of the task force were Rob van Apeldoorn (Alterra), Vineta Goba (European Centre for Nature Conservation - ECNC), Zita Izakovicova (Institute of Landscape Ecology of the Slovakian Academy of Science ILE-SAS), Stefan Klotz (Helmholtz - Centre for Environmental Research – UFZ), Julia K. Steinberger (IFF) and Angheluta Vadineanu (Departmet of Systems Ecology,University of Bucharest - UNIBUC). Anke Fischer (Macaulay Institute) actively took part in the initial phase of the task force operations but had to withdraw due to other engagements.

5.2

Setting concrete aims and planning the activity

Members of the task force were not initially involved in defining the objectives of the BE/BD pilot – some had not even taken part in ALTER-Net activities before. Therefore, the work of the task force began in December 2007 with discussing, assessing and partly redefining the goals of the activity. The process was iterative, in the sense that the goals were constantly specified based on the experiences gained during the activity. As a primary aim was to create a feasible working plan given the project's timeframe, the task force entered into careful discussion of the goals of the activity, which included a consideration of practical working methods.

In the following section, we outline the key points of the task force's discussion to clarify the basic choices made. These discussion points relate both to the subject matter and the general organisation of the activity.

Defining the topic

The work of the task force started with the idea that the topic under consideration – bioenergy – can refer to several different things. For example, bioenergy can be defined based on the source of biomass (agriculture, forestry, waste) or on technology (solid fuels, liquid biofuels or gas) and end use (heating, power generation, traffic). Following from this, a number of questions arose: How to cover such a wide range of issues in the pilot? Should the scope of the pilot be somehow narrowed? Could the pilot be carried out based on a more general definition of bioenergy? As it was the task force's realization that it lacked the expertise to produce a definition of bioenergy, it decided to keep to a broad definition.

This choice had implications for the goals of the activity. Expressing that it was too demanding a task to provide a general overview of bioenergy-related research topics, the task force decided instead to focus its work on the identification of interlinkages between bioenergy and biodiversity research carried out by ALTER-Net partners. In other words, rather than trying to cover the scientific field in its entirety, the task force's work became directed at mapping bioenergy-related issues that are potentially relevant for biodiversity policies as well as identifying related expertise within ALTER-Net.

In addition to creating an inventory of and synthesizing existing research and expertise in ALTER-Net, the task force aimed its work at addressing future issues, topics and research needs. During the activity, the latter goal gained in significance. This was partly because of the choice of working methods (see 'Tools and methods' below and annex 3).

The relation between IDR activities and the pilot

The task force also felt it important to discuss the relationship between the BE/BD pilot and the overall IDR plan within ALTER-Net. Two goals were determined: 1) to produce a synthesis of bioenergy/biodiversity related knowledge within ALTER-Net; and 2) to facilitate interdisciplinarity by creating a framework for interdisciplinary dialogue. The latter was conceived by the task force to require an analysis of process, methods and tools.

Since the evaluation of interdisciplinary activities was already being carried out[15], and the bioenergy pilot was only one part of interdisciplinary activities – a 'case study' of interdisciplinarity – the task force raised the possibility of combining the two evaluation processes and suggested that the same person overseeing the

[15] Carried out by Riku Varjopuro for Allan Watt, WP I1 leader; WP I1 is a distributed institute for biodiversity research.

interdisciplinary activity evaluation to assess the BE/BD pilot. As the same idea was raised at the ALTER-Net activity leaders tele-meeting, it was agreed that the two assessments would be integrated (see chapter 7).

Tools and methods

To reach its aims, the task force discussed the most appropriate methods to facilitate interdisciplinary exchange. A difficulty that was identified was the impossibility of carrying out as many meetings as was initially planned for a one-year timeframe. Therefore, other possibilities to initiate interdisciplinary dialogue were discussed, namely e-conferences, of which CEH had experience (see e-conferences of European Platform for Biodiversity Research Strategy, www.epbrs.org). Several benefits were identified for using e-conferencing: more experts outside ALTER-Net could be invited to meetings, thus making ALTER-Net more visible; the tool could be tested for use in future ALTER-Net activities; and costs could be cut. However, after consulting the facilitator of EPBRS e-conferences[16], the task force decided to reject this possibility: the e-conference tool was seemingly a good tool to put forward information, but not the right tool for focussed interdisciplinary dialogue.

Other methods were also discussed, including interviews and focus groups. However, it was thought that interviews lacked the group interaction component, with the task force being more interested in ways of bringing to the same table people with different backgrounds. Hence, the task force decided to abide by the original idea of running workshops and meetings, but upon a reconsideration of the number that could be realistically carried out.

Identifying and mobilizing experts

While e-conference was still considered as an option, the task force started to search for experts who would be prepared to give input in terms of short discussion papers or data. Choosing the e-conference tool would have required more preparatory work from the task force, with the collection of background information and identification of relevant topics having to occur in advance.

Information was collected through a simple questionnaire aimed at mapping bioenergy (or related) projects as well as bioenergy experts within ALTER-Net and other organisations. The questionnaire included questions about the informants' research profiles and links to the bioenergy/biodiversity topic, and a request for relevant bioenergy/biodiversity publications and references. The compilation of lists of people, literature and projects started from the organisations each task force member belonged; this was done with the intention to widen the circulation of the questionnaire at a later time. However, when e-conferencing was rejected as a tool by the task force, it became unnecessary to map existing expertise in such an in-depth way. Nevertheless, the already gathered information was put to use, e.g., for the planning of workshops, the invitation of experts identified in the questionnaires to meetings/activities and the use of literature identified in the questionnaires for background material in reports and other publications (see the summary in chapter 6). In particular, the survey was effective in identifying a few of the experts who were already active in research connected to the topics of interdisciplinary interest to ALTER-Net; these experts were regarded as being able to provide their research results, perspectives and experiences to the task force.

However, the survey had its limitations. In particular, it proved to be an insufficient method to identify those whose work could potentially be related to the topics of

[16] Juliette Young at CEH

interest and to those without a firm background as yet in these fields of research but for whom there could exist research appeal. Therefore, a call for an international workshop, held in Edinburgh in October 2008, was circulated to the BE/BD contact persons in each ALTER-Net partner organisation. The network of contact persons was established by sending a letter to the ALTER-Net Council members with a request to assign contact persons for the BE/BD pilot in spring 2008. The contact persons identified participants from their own organisations to attend the Edinburgh workshop.

The mobilization and motivation of experts was a theme discussed at length by the task force. The operating question was one of how to motivate ALTER-Net partners and experts to participate in the pilot. The task force realized that it should carefully specify the kinds of benefits the participants would get from the pilot activity. In particular, it was felt that experts who are not all that familiar with bioenergy issues might find participating in the activity senseless and frustrating. Therefore, the task force decided to emphasize that some incentives of participating in the activity involved funding application support and future collaboration development. These were addressed as the key practical aims of the activity, and the BE/BD pilot was presented as a forum for finding future partners for projects offering contacts, networks and co-operation possibilities.

5.3

Identifying relevant literature

For the preparatory purposes of the BE/BD pilot, SYKE started to collect literature on bioenergy/biodiversity interlinkages in the beginning of 2008. A superficial Google search and a search through scientific databases was carried out; the search was later complemented by the literature pointed out by questionnaire respondents.

The material was compiled into a table of relevant BE/BD topics (see annex 4; main topics addressed by the literature review are summarized in the table 5). The table was structured according to the three sources of biomass: agriculture, forestry and waste, and according to the DPSIR framework. The use of DPSIR also had its limitations; for instance, a part of the topics could not be fitted into the schema. However, it was decided that these parts were to be kept in the table, so as not to lose any significant information.

The table was circulated as background material for workshops. Moreover, the table provided material for the writing of a popular article published in a major Finnish newspaper *Helsingin Sanomat* (Peltola & Rinne 2007). This functioned as a way to draw national attention to the BE/BD pilot and yielded a few contacts with stakeholder experts.

5.4

Communication

In the beginning, the BE/BD pilot was communicated only internally within the ALTER-Net network through email. In April 2008, the plan was presented to the ALTER-Net advisory board. Although supportive of the pilot, the advisory board saw the external communication of the pilot as a weakness and challenge. In response to this, the task force established and maintained a website to better communicate the pilot and the interdisciplinary framework. The website (www.environment.fi/syke/bioenergycase) was launched from the SYKE server, as rapid updating by the leader of the pilot was necessary; this option was perceived to be less risky compared to carrying out the updating from CEH, which would have required an additional step.

All the same, an electronic link to the ALTER-Net website was immediately built, and from there on, the site was used for informing about forthcoming events and activity outputs, and for disseminating the material produced through the pilot.

Another issue emphasized by the ALTER-Net advisory board was the role of stakeholders. This element had indeed been lacking from the pilot planning stage as well as from the first workshop held in Helsinki, in March 2008. However, after this concern was raised, special emphasis was given to the stakeholder aspect. In later stages of the process stakeholders outside the research community were involved.

5.5

Workshops and follow-up events

The core activities of the BE/BD pilot included two workshops, titled "Interlinkages between biodiversity and bioenergy", organised in Helsinki and Edinburgh respectively, and a working group meeting. The participants and organisations represented in the workshops and in the follow-up meeting are summarized in the table 3 below. To test the relevance of the research ideas, the workshop results were presented to the participants of the LTER Europe annual conference in December 2008. In addition, the working groups presented their project proposals at the ALTER-Net final conference in March 2009 to get feedback as well as to call for new participants.

Table 3. Participation in the BE/BD pilot

	Helsinki March 2008	Edinburgh October 2008	Vienna February 2009	Total
Number of participants	14	26	17	40
Number of ALTER-Net partners	2	12	9	13
- Organisations outside ALTER-Net	-	4	-	4

The first workshop was held in March 2008, three months from the start of the activity, and was attended by 14 participants. The meeting was carried out as an internal activity of SYKE except for one external expert[17]. The experts were invited from a number of SYKE research programmes, thus covering expertise in ecology, marine research, the social sciences as well as energy production.

The workshop had three aims: 1) to draw together bioenergy/biodiversity related expertise within one, relatively large research organisation; 2) to encourage experts to think about new, possibly interdisciplinary research topics and possibilities to cooperate in the field of bioenergy-biodiversity interlinkages; and 3) to test structured methods for interdisciplinary discussion.

The Helsinki workshop functioned as a pre-scoping workshop, in other words, a pilot for a pilot. The experiences of this workshop were used for planning the international workshop, which was held half a year later, back-to-back with the October 2008 ALTER-Net mid-term meeting addressing interdisciplinary activities.

In this latter workshop there were participants from 12 ALTER-Net partner organisations and 4 stakeholder organisations, bringing the total to 26 attendees. The participants of the workshop had different backgrounds: biodiversity research, economics, social sciences, forest sciences, physics, etc. The scope and level of the workshop was planned by the task force. It was decided that invitations should cover the highest possible number of ALTER-Net institutes as well as external stakeholders. The role of institutions from outside of ALTER-Net was seen as an important motivating force for the participants: outsiders could offer something special, such as information on new research needs, technologies etc.

[17] Zuzanna Valkovcova from ILE-SAS

Based on the experience gained in Helsinki, the task force sought and discussed opportunities to organise similar national events in other countries to support the international process. The task force received reports[18] about a similar event in the Tatra region, one that was especially based on stakeholder recruitment. National workshops or workshops within partner organisations were, in particular, considered as an option to mobilize experts to the international workshop with Alterra suggested as a potential venue. However, due to time limitations, the task force had to give up organizing any further national workshops and instead focussed on the planning of the international event in Edinburgh.

[18] Supplied by Zita Izakovicova and Zuzanna Valkovcova (ILE-SAS)

6 The IDR dialogue method: From hundreds of ideas to a dozen major knowledge needs and to a handful of carefully planned research plans

Author: Taru Peltola[19]

The pilot workshops were exercises in interdisciplinary work – involving experts from various different organisations (research and other organisations). A structured method was used to efficiently negotiate new research topics and issues during the workshops (for method guidelines, see annex 3). The method was developed on the basis of widely used tools in innovation activities, following the foundational principles of open innovation[20]. Although initially developed for the purposes of commercial innovation or technology foresight, similar methods have been used in scientific and science-policy contexts (e.g., Cabrera et al. 2008; Sutherland et al. 2006). In the pilot workshops, the structured method was tailored to fit the purpose of facilitating interdisciplinary research.

The basic principles adopted as part of employing the method include: 1) generating a few genuinely new ideas requires a great number of ideas; 2) holding back critique in the early phases of the process to ensure that even the weakest signals get through; and 3) accepting misunderstandings as useful because they may open up new avenues for collaboration and ways of thinking. Although important in generating commercial innovations, the principles of open innovation are also applicable in interdisciplinary contexts where innovation and communication are subject to similar types of motivations and obstacles, e.g., when there is a need to identify new ideas between established fields; when some perspectives dominate over or suppress other voices; or when there are difficulties in finding a common language.

The working method applied had five main steps:

I Background materials and pre-workshop exercises to introduce previous research and knowledge
II Brainstorming to produce as many new ideas as possible linked to the topic
III Preliminary selection and processing of ideas
IV Sorting out of and selection of ideas
V Further development and presentation of ideas and recruitment of research groups

The overall structure of the workshop process and its outputs are depicted below in fig. 3.

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[19] SYKE

[20] There is a growing body of literature on open innovations and creativity techniques, and it is simply not possible to review all of the work here. The concept of open innovation is usually linked with the work of Henry Chesbrough who claims that 'closed' innovation practices do not work when knowledge is becoming more and more widely distributed between organisations. Thus, methods to enhance communication and ideation are needed.

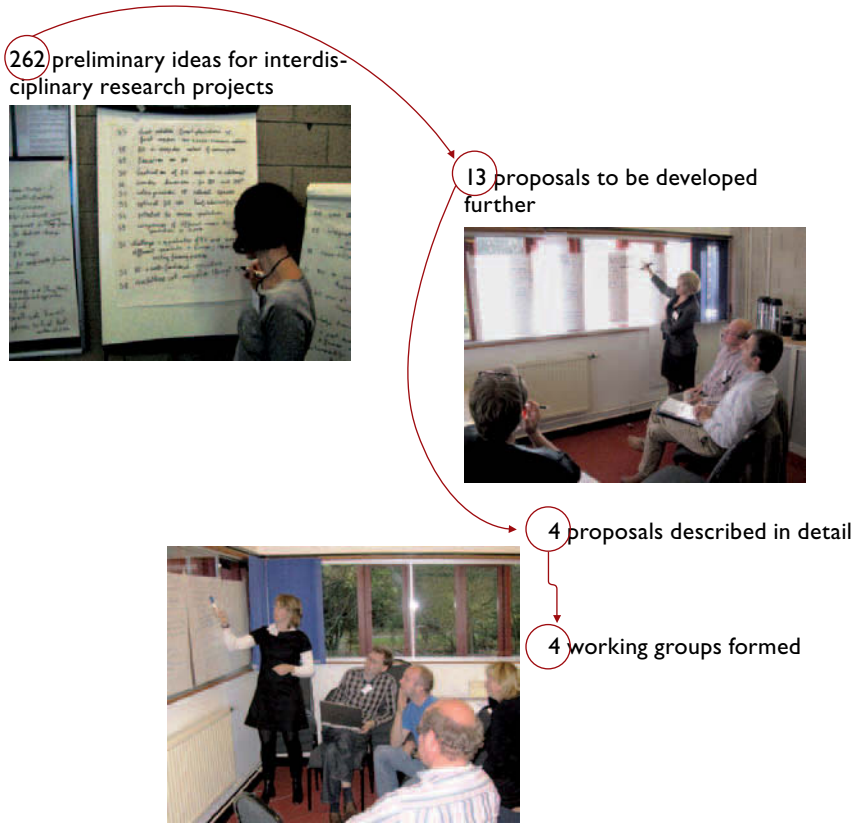

Fig. 3. The process and outputs of ideation during interdisciplinary dialogue

In developing the method, we paid special attention to the difficulties detected in interdisciplinary research, in particular, the means to avoid imposed research questions based on pre-given scientific approaches and communication across disciplines (see chapter 2). The method aimed to facilitate interdisciplinary dialogue by establishing an open and non-critical way of working. This was achieved, first, by putting a time limit on brainstorming: the pressure to produce as many ideas as possible in a relatively short time forces participants to orient towards a non-critical way of working. Second, it was emphasised that all ideas expressed by participants should be written down. The group facilitators were instructed in advance to ensure an uninterrupted and equal way of working. In addition, prior to the workshop the participants had been given background material which gave them time to think about their position and contribution to the process. It should also be emphasised that working atmosphere can be influenced by group size: in large groups some participants tend towards being silent, than if they worked within a smaller group consisting of 4–5 persons.

At the Edinburgh workshop, the brainstorming phase yielded 262 preliminary project ideas (annex 7). The processing and selection of these ideas were based on predefined criteria and three steps. In the preliminary selection phase, each participant was asked to pick *three most interesting* ideas or combination of ideas from the list produced in the brainstorming session. The second step included a group decision on 3–5 of the ideas picked to be processed and described further. Each group was given the opportunity of coming to a collective decision either through discussion or group vote. This was followed by each team introducing its ideas to the rest of the workshop group. For the third step of selection, each participant was asked to choose four *most interesting and feasible* ideas and affix them with plus signs. The participants were told that only one of the ideas they chose could come from the group of ideas selected collectively their original team. This rule was enforced to provide leeway for

the ideas of other teams. In all, the selection phase produced 13 project ideas regarded as interesting and important by the participants.

For the final working session, in which the most popular ideas were developed into research plans, the workshop facilitators grouped similar, overlapping or somehow connected project ideas and came up with a common title for the grouped ideas. In the Edinburgh workshop, four such titles were formed. The participants were then asked to choose a project idea to develop further for the last session.

In the last working session the teams were asked to combine the ideas listed under a title; they could add to or leave out aspects of the ideas. The groups were instructed to aim for a specific end product, i.e., a framework for a research proposal and a plan for post-workshop work. For this, each team was given a guide for putting together the research plan, including main titles and questions to be discussed. At the end of the workshop, the participants were requested to sign up for the research teams they were interested in joining.

The outputs of the interdisciplinary dialogue are reported in the chapter 7.

Experimenting with the results

The two workshops were followed by the February 2009 working group meeting in Vienna. In addition, the outputs of the interdisciplinary dialogue on bioenergy-biodiversity interlinkages, the interdisciplinary research ideas and focussed research plans, were presented at the March 2009 ALTER-Net final conference in Leipzig and at the December 2008 LTER Europe conference in Mallorca.

Vienna meeting, February 2009

From the Edinburgh workshop, four working groups were formed. The groups decided to reconvene and have a joint two-day meeting to continue their work on the topics (below) derived at the workshop (for details see chapter 7):

Topic 1: Integrated multilevel policies on bioenergy, biodiversity, environment and food
Topic 2: Integration of sustainable bioenergy pathways in multifunctional landscapes
Topic 3: Good practices and sustainability indicators for bioenergy
Topic 4: Impact of EU bioenergy policies on biodiversity and socio-economic conditions in regions outside Europe

The meeting included two intensive group work sessions and a plenary session in which the groups exchanged views and reported their plans. Two groups decided to work together in Vienna. The progress made by the teams is reported below:

Group 1/ Topic 1: Integrated multilevel policies on bioenergy, biodiversity, environment and food

Working on the topic in Vienna, Group 1 consisted only of two social scientists and an ecologist, who joined the group at a later stage of the work. The group continued the conceptual development of a proposal, which had been preliminarily shaped during the Edinburgh workshop. The group had not come across any immediate call for funding applications for which this proposal could be aimed, but decided anyway to continue with planning a pilot study for research proposal. As a result of the Vienna meeting, the group was able to deliver a conceptual/methodological tool for mapping and identifying potential cases of institutional arrangements to co-manage natural resources. From the feedback received from other attendees of the Vienna meeting, the group obtained many suggestions for possible cases. Armed with these topics, the

group decided to finalize a concept note, which included a call for research cases and partners to be circulated at the March 2009 ALTER-Net final conference in Leipzig.

Group 2 / Topics 2&3: Integration of sustainable bioenergy pathways in multifunctional landscapes & Good practices and sustainability indicators for bioenergy

Group 2 decided to merge two topics derived at the Edinburgh workshop because of the close connections between them. The group involved people from two previous separate working groups and a number of new colleagues. The group developed their project idea aiming for EU framework 7 call for proposals approaching in April 2009. As part of doing this, there was much discussion on how the group's research idea could fit into the somewhat technical prescription of the call text. In any case, the group decided to continue with its project idea preparation, keeping an eye out for other research calls as well for funding. In the end, the group managed to structure its project proposal into work packages, appointing members to certain tasks. In particular, there was interest among group members to invite non-research stakeholder input to the work packages, in order to increase the effectiveness and distribution of the results of their project.

Group 3 / Topic 4: Impact of EU bioenergy policies on biodiversity and socio-economic conditions in regions outside Europe

Group 3 had invited new members to the team after the Edinburgh workshop. It did not have a specific call for funding applications to aim at for project idea development, but decided, immediately after the workshop, to keep abreast of forthcoming calls, while coming up with ideas to influence future calls to improve the possibilities to get funding for the topic it considered an important opening in bioenergy research. The group decided to prepare a concept note to be circulated at the March 2009 Leipzig conference, to express the importance of its project idea, in particular to clarify the objectives of the project idea and to point out its social and political relevance. Finally, the project idea was structured into work packages and working methods were defined, with the end product being a project that will produce a synthesis of policy and policy recommendations.

Leipzig conference, March 2009

Two of the three working groups formed in Vienna presented their draft proposals in the open space session at the ALTER-Net final conference in Leipzig while one group communicated their plan to EC representatives. The purpose of the open space session was to find and recruit to the teams interested partners who could bring new insights to the proposals. One of the groups succeeded in getting attention of several persons who had not been previously involved in developing the plan.

LTER Europe conference in Mallorca, December 2008

The Edinburgh workshop produced a volume of ideas, but only a few were selected for further development. Because participant feedback indicated that the ideas generally (for the entire list of ideas generated at the Edinburgh workshop, see annex 7) could be of use beyond the four selected by the working groups, it was decided that it would be advantageous for the ideas to be considered further. Therefore, the Edinburgh results were taken up at the LTER Europe conference in Mallorca. This was also a response to the invitation for the ALTER-Net interdisciplinary community to suggest research ideas for the LT(S)ER platform network. The task force leader of the pilot presented the source of the ideas, and circulated the ideas to the participants of the conference, which consisted of approximately 50 persons from several European universities and

other research organisations, tasked with picking those ideas particularly relevant to the LT(S)ER context and in which they might have an interest in.

The most popular ideas chosen at the conference are summarized in table 4. Two of the three top ideas were closely linked with those that were chosen at the Edinburgh workshop for further development. However, LTER conference participants also picked ideas that the Edinburgh participants did not select, such as the utilisation of invasive species as biomass in energy production.

Table 4. Topics considered relevant for LT(S)ER, as selected by 2008 LTER Europe conference participants. The numbering of ideas refers to ideas listed during the Edinburgh meeting (Annex 7).

No.	Idea	Hits
66	Methods of valuing biodiversity to support decisions	3
156	Design of new landscapes with high biodiversity value	3
178	Biodiversity monitoring in relation to biomass production	3
4	Where are main biodiversity values relative to bioenergy potential	2
9	How are biodiversity values related to biomass production – are these coupled?	2
12	New species? Ecologically suitable species	2
14	Risks associated with alien species and cultivars	2
16	How to combine biodiversity with biomass	2
17	Is the plantation an ecosystem?	2
23	Is there a biodiversity problem? How big is it?	2
24	How much pressure can be put for biodiversity? > carrying capacity > ability to recover	2
30	Energy efficiency & cost	2
58	Monocultures/multispecies mixtures (low input systems)	2
81	Biodiversity value of abandoned farmlands	2
91	Use of invasive species as biomass	2
95	Aesthetics and bioenergy crops / animals	2
133	Uncertainty & confidence	2
139	Climate change adaptation > planting among trees > biodiversity/bioenergy viability	2
140	Conservation of ecosystems	2
161	Producers of biodiversity – get paid for production of it	2
192	Bioenergy + landscape function	2
202	Influence of bioenergy production on water	2

7 Outcomes: research needs on bioenergy-biodiversity interlinkages

Authors: Taru Peltola[21], Berien Elbersen[22], Janne Rinne[23]

One of the three objectives of the BE/BD pilot was to gain valuable knowledge on bioenergy-biodiversity interlinkages. This chapter presents the outcomes of the various stages of the pilot, starting with outcomes from an additional activity (activity B 6, annex 1) of the ALTER-Net IDR plan. This was a position paper on bioenergy and its development was one activity within the IDR plan. The writing process, led by Alterra[24] included a workshop, individual and shared writing, as well as email commenting, presented in draft form to the Edinburgh workshop participants (see chapter 5). Both the BE/BD pilot and position paper activities were interlinked through joint participation by some researchers in both activities and through exchange during tele-meetings and at the Edinburgh piloting workshop and the Edinburgh mid-term IDR plan meeting.

7.1

The ALTER-Net position paper task: can biomass be used from farmland, abandoned land, forests and nature conservation areas in synergy with biodiversity conservation?

Overall objective

In this report we will investigate whether renewable energy targets and the reduction of biodiversity loss are compatible. We will especially focus on where and how biomass resources can be cropped and/or harvested without compromising biodiversity, and what the main knowledge gaps are that future research can address.

Context

In January 2008, the draft Directive on the promotion of the use of energy from renewable sources was introduced by the European Commission, and in December of the same year, it was approved by the European Parliament. The Directive sets an overall target of 20% renewable energy to be reached by 2020 and a 10% target for biofuels in total transport fuel consumption. At the same time, the European

[21] SYKE

[22] Alterra

[23] SYKE

[24] Berien Elbersen (Alterra) led the process, with contributions from: Pia Frederiksen (Denmark's National Environmental Research Institute- NERI), Ulf Grandin (Swedish Agricultural University – SLU), Raimo Heikkilä (SYKE), Dave Howard (Centre for Ecology and Hydrology, UK - CEH), Zita Izakovicova (ILE-SAS), Poul Henning Krogh (NERI), Lars Lundin (SLU?), Linda Meiresonne (INBO), Joop Spijker (Alterra) and Jeanette Whittaker(CEH).

Sustainable Development Strategy (SDS) emphasizes the importance of: combating a further decline of biodiversity; sustainable management of natural resources; and halting climate change. According to the SDS, these objectives should be integrated in *all* EU policies, including those governing the energy, agricultural and forest sectors. The strategy has set a target of halting the decline of biodiversity by 2010. The first progress report, however, expresses serious concerns on reaching this target, and recommends that forthcoming actions should include an overall strengthening of the integration of biodiversity impacts into policies and programmes.

At the moment, there is still little understanding of whether realisation of the bioenergy targets can be combined with prevention of further biodiversity decline. Although estimating the exact amount of land required for bioenergy is difficult, it is clear that the pressure on land will increase dramatically under a growing biomass demand. This may cause adverse effects on biodiversity, as it may lead to the further intensification of existing land uses, both on agricultural and forest lands, but also the conversion of non-cropped biodiversity-rich land into cropped or forested areas. The Directive states that biofuels shall not be produced from raw material obtained from land with a recognized high biodiversity value (such as undisturbed forests), areas designated for nature protection purposes or highly biodiverse grasslands. However, it is not clear as to how this land resource is exactly defined and identified (e.g., mapped), and whether not being accountable to the renewable energy target provides enough protection to valuable ecosystems located in areas with markets, offering high prices for biomass feedstock.

Aims and overall approach

Two questions will be posed in this paper:

1. What options exist to increase the renewable energy potential from terrestrial resources in the EU, in synergy with biodiversity conservation or without causing additional loss of biodiversity?
2. What are the research needs for reaching an increased renewable energy share from terrestrial resources in the EU, without compromising present and future biodiversity values?

Two types of information sources will be used to address these questions:

1. a literature search providing better understanding of the effects on biodiversity from land use changes and changes in the management of different productive and non-productive land resources, and an overview of the research state-of-play in relation to this topic
2. seven EU country case studies, executed according to a similar outline, to collect (comparable) information on: policies/actions and present and planned stimulation measures for producing/consuming biomass-based energy and accompanying sustainability and/or certification schemes including: biodiversity conservation objectives; policies in relation to biodiversity conservation; present and future share of renewable land based biomass-based energy in total energy consumption; risks for and synergies with biodiversity from present biomass collection/production (if information is available) and types of biomass-based bioenergy projects that are in place or planned

Report outline

After the introductory chapter, the scientific foundations for the rest of the study, based on published and expert information, are discussed in the second chapter. In Chapter 3, the national implementation of bioenergy targets is discussed for the seven case study countries, including how this implementation is linked to sustainability criteria especially in relation to nature conservation. In Chapter 4, the actual practice

of biomass cropping and/or harvesting for bioenergy purposes is discussed for the seven case study countries. This section will also provide a categorization of the biomass harvesting practices identified and a discussion of these projects' potential negative effects to as well as the synergies with biodiversity. In chapter 5, the two research questions are addressed and the main conclusions drawn from the findings of this study, particularly the optimal use of biomass resources in synergy with halting biodiversity loss. Research gaps and recommendations for future research are also discussed in this section.

7.2

Summary of literature review on bioenergy/biodiversity

To get an overview of the ways in which bioenergy production is linked with biodiversity production, SYKE began to gather relevant literature and existing research information on bioenergy/biodiversity. The survey results proved useful along the various phases of the piloting process. It was used for providing background information to people from a variety of research and professional fields participating in the various stages of the piloting process, and in communicating about the bioenergy/biodiversity issue beyond the ALTER-Net community.

This literature considered – scientific articles, reports and policy documents – does not constitute a full review as the literature on bioenergy/biodiversity is too vast and systematic reading that would have taken a considerable amount of time than the resources of this piloting allowed. The review did nonetheless provide a snapshot of the main topics that have already been covered in research and those that are yet to be investigated, thereby helping to identify pertinent research needs (for a description of the literature and topics identified based on the DPSIR categories, see annex 4).

The main results of the literature review can be thus summarized: overall, the literature addressed both the impacts of bioenergy production and climate change on biodiversity. Specific themes vary according to the type and source of bioenergy production (see table 5).

Table 5. Research themes linking bioenergy and biodiversity

Source/type of biomass used in energy production		
Field crops	Forest fuels	Organic waste
Species diversity: mixture of crops (positive impacts possible)	Boreal forests: pressures on ecosystems (e.g.,, quantity of deadwood, nutrient cycles)	No impacts on biodiversity, pressures to increase the utilisation of waste
Intensive farming methods: loss of ecosystem services (e.g.,, increasing erosion and land quality)	Tropical forests: changing land use patterns (e.g.,, palm oil plantations) and reduction of natural forest cover	
Land use patterns		

The problems and measures are framed differently according to the different types of bioenergy production. The problems arising from increasing bioenergy production can, on the one hand, be linked with large, landscape level changes in land use such as changing land use patterns following forest clearance for energy crop plantations or replacing field crops with energy crops. On the other hand, some of the problems are related to changing/existing practices of producing or harvesting biomass. For instance, the impact of forestry on biodiversity can change when the amount of deadwood is reduced due to the large-scale harvesting of logging residues. The impact of intensive agriculture, in turn, is often similarly independent of food or energy crop production; the impact is dependent on specific production methods rather than the end use of biomass.

The difference means that the challenges of bioenergy production need to be tackled in different ways: the evaluation of existing and emerging practices and the development of best practices that take into account local circumstances can help mitigate the latter type of problems while the former type would require cautious land use planning and protection of valuable habitats.

So far from the available literature, it is possible to identify some of the potential impacts of bioenergy production and to form an idea of the suggested restrictions to production potential. On the other hand, less literature is available on policy responses and successful policies on bioenergy/biodiversity problem-solving. The review clearly points out that there is room for interdisciplinary analyses of governing bioenergy development: avoiding negative impacts of bioenergy production by local, national and global level policy measures and practices. These would help to implement the EU bioenergy targets in a more sustainable way and offer local decision makers and investors practical guidelines and examples.

7.3

Summary of the results from bioenergy pilot workshops

The outcomes of the interdisciplinary dialogue at the Edinburgh workshop, facilitated by structured methods are summarized in this section (for a list of ideas generated during the workshop, see annex 7).

The aim of the dialogue method was to produce a substantial amount of research ideas as material for the interdisciplinary planning of research projects. The first step in the workshop involved a brainstorming activity that produced a broad list of ideas and issues, possibly relevant for identifying the interlinkages between bioenergy/biodiversity. The next step included preliminary selection of ideas– from the 262 research ideas listed on flip charts, 13 were shortlisted and further developed. Then, the ideas were grouped into four themes based on the preferences and choices of the participants. As a final output of the workshop, four working groups were formed to continue writing research proposals on the chosen topics (for a description of each topic, see table 6).

Table 6. The output of the Edinburgh workshop.

Topic 1: Integrated multilevel policies on bioenergy, biodiversity, environment and food
Background: The integrated multilevel policy approach to bioenergy is justified by three developments and the problems related to them: 1) Heightened competition between various activities in the same space (e.g.,, agriculture, tourism, and nature conservation) is occurring, following the need for new strategies in optimising the use of biological resources and the locations for the activities . 2) Rural space has traditionally been incorporated into sectoral policies, which in turn has led to policy failure, i.e., constant conflicts over policy goals. Integrating bioenergy products into existing policy structures requires developing institutional capacity to go beyond narrow sectoral interests and to cross horizontal boundaries of sector bureaucracy. 3) Bioenergy production leads to the restructuring of networks and coalitions of actors at various spatial levels. As the capacity and role of the nation state is in transition, the challenge translates into how the actors are able to accommodate simultaneous interdependencies at the local, regional and global levels. *Objectives:* The main task is to clarify how to successfully integrate global and European level policies into local and regional activities. Further objectives involve developing ways to make the competing interests fit each other and finding optimal local solutions for the different bioenergy production regimes. This implies identifying the challenges and obstacles to integrated multilevel policies. Contact person: Pekka Jokinen, Finnish Environment Institute (SYKE), pekka.jokinen@joensuu.fi
Topic 2: Integration of sustainable bioenergy pathways in multifunctional landscapes
Although the development of the bio-based economy in Europe does seem a promising solution to the growing energy crisis, the reality of the situation is far more complicated. The EU has already set ambitious biofuel production targets for its member states even before the full implications of achieving these targets have been fully researched and analysed. The current situation implies that there a conflict will arise due to the divergence between the increasing demand for land for growing bioenergy crops and the resulting pressure on ecosystems and biodiversity. Therefore, it is proposed in this research project that designs and prescriptions be developed for sustainable bioenergy production at the landscape level, to set sustainability criteria for bioenergy production and create tools for integrating bioenergy production in multifunctional landscapes. The end users of the project results will be farmers and landowners, bioenergy business owners, banks and finance institutions, technology companies, local governments and communities. Further steps in the development of this proposal include Alterra's internal review of the proposal and subsequent communication of the proposal to working group. Contact person: Vineta Goba, European Centre for Nature Conservation, ECNC goba@ecnc.org
Topic 3: Good practices and sustainability indicators for bioenergy
The main question is to understand the influence of biomass harvesting on biodiversity; effective descriptions of the understanding then need to be integrated with social and economic measures to produce a comprehensive indicator of sustainability. The indicator has to be sensitive to the dynamics of land use change in both the spatial and temporal dimensions, and be capable of informing debate about change to alternative land use options in agriculture, forestry and of abandoned land and nature. It is important that the indicators of sustainability are especially employed at a landscape level, so that the perspectives of the environmental carrying capacity on the national and EU levels can be better informed. On the basis of the study, it is expected that it would be possible to develop indicators to identify best practices and guidelines towards the certification of bioenergy. The potential users of the information include e.g., governmental decision makers, municipalities, landowners, energy policy communities, the energy sector and NGOs. Contact person: Raimo Heikkilä Finnish Environment Institute (SYKE), raimo.heikkila@ymparisto.fi
Topic 4: Impact of EU bioenergy policies on biodiversity and ecosystem services outside Europe
There is a demand in the EU for bioenergy imports from other parts of the globe. This requires intensive, externally driven bioenergy production in many places of the world. This study has a two-fold aim to analyse: 1) the local level impacts of importing bioenergy (both in the production country as well as in the demand country), taking into account the impacts on biodiversity and ecosystem services as well as other social and economic consequences; and 2) the global level effectiveness of importing bioenergy, the focus being on monetary and energy issues. The study would be based on local case studies and global flux analyses. It would triangulate methods from several disciplines including ecology, geography, informatics, economics and the social sciences. Working closely with local stakeholders would be key, as would local researchers. The Finnish Environment Institute (SYKE) will take the plan forward, in close collaboration with UFZ and other interested parties. Contact person: Eeva Furman Finnish Environment Institute (SYKE), eeva.furman@ymparisto.fi

8 Assessments of the interdisciplinary framework

Authors: Taru Peltola, Riku Varjopuro & Eeva Furman[25]

The development of the IDR framework especially through the BE/BD pilot consisted of several steps and phases where choices concerning working methods were made. The process consisted of positive as well as negative experiences, bringing to light the power, potential and limitations of the various ways of identifying interdisciplinary research needs and synthesizing complex challenges through interdisciplinary collaboration within ALTER-Net. The various steps and phases are summarised in fig. 4 and further elaborated in this chapter.

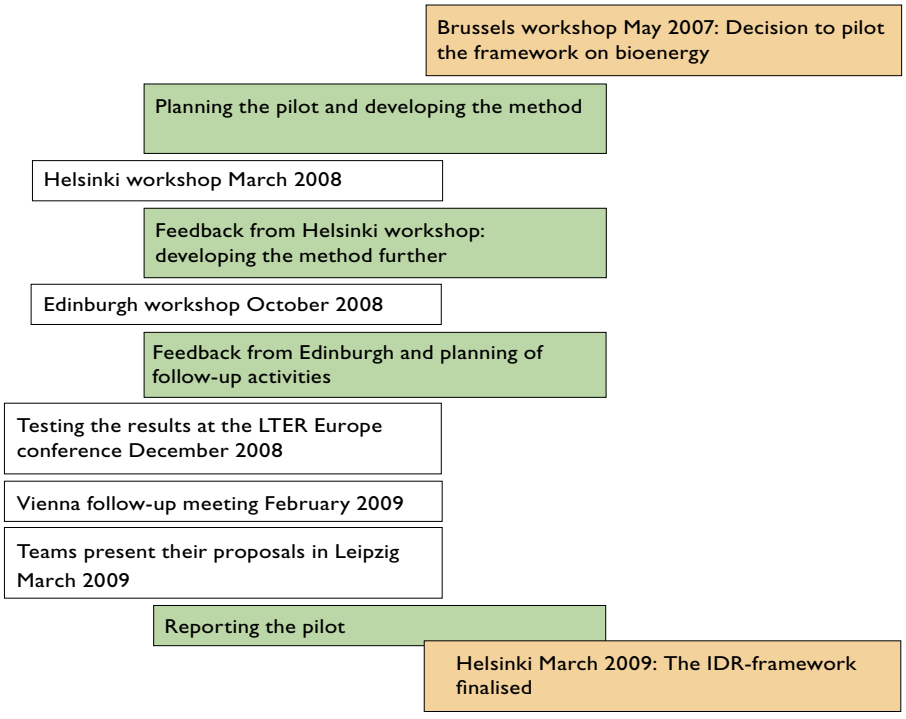

Fig. 4. The steps in the BE/BD pilot process.

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8.1

Feedback on the workshop methods

Feedback from workshops was collected in several stages and was used in refining the method (annex 5). The main points are summarized by workshop below.

Helsinki workshop

Feedback from the Helsinki workshop was used in planning the Edinburgh workshop. Overall, the feedback was positive and the participants felt that the workshop method was an efficient way towards creating interdisciplinary understanding of the problem area. In particular, it was the more critical types of comments that were of great assistance in planning for the reapplication of the method in the Edinburgh workshop. The main points of feedback of the Helsinki workshop include:

1. The purpose of the activity should be made more clear: Workshop participants felt that group work tasks should be both specified more clearly and specific, e.g., the tasks should aim towards the development of a common project proposal (for a certain call for research proposals), writing of a review article, etc. The goals and activities of the IDR plan and the BE/BD pilot were presented at the beginning of the workshop, but not the goals of the group work itself (e.g., whether participants ought to focus on constructing a project proposal, article, etc.). In Edinburgh, group work goals were tied to the explicit aim of forming project proposal working groups.
2. The open framework of the workshop does not work for everybody: Some workshop participants wanted the organisers to define the identities and roles of participants in advance. However, others seemed satisfied with workshop's open structure, which they felt provided the opportunity for roles to be self-defined. In Edinburgh, there was no pre-defined role setting, but the agenda of the workshop was clarified from the start.
3. Workshop participants indicated that the method could find application in: a) facilitating communication within large organisations (to create common understanding of present organisational resources and to bring people together to discuss new topics); b) facilitating stakeholder discussions on a national level on new topics; and c) in producing concrete documentation or synthesis of subjects important to ALTER-Net.

Workshop facilitators, in turn, made the observation that it is not easy for every expert to recognize in advance the relevance of their own work and expertise with regard to the workshop topics. The workshop method thus succeeded in surprising the participants in a positive way, by convincing them that they could identify their own way of providing input to the process.

Edinburgh workshop

Similar to the feedback received from Helsinki workshop participants, the feedback from the Edinburgh workshop was generally positive and encouraging. Feedback, collected at the end of the workshop, consisted of a number of useful points and observations:

1. Effective method: Workshop participants felt that the method efficiently produces a significant number of research ideas and needs. It helps the discussants to focus on the end product (research projects) and prevents long unfocussed discussions in which people tend to put their own visions/ideas forward. The method was also seen as valuable in encouraging people to join

groups and engage in discussions which would not have been their obvious choice.

During the meeting it was observed that some participants (mainly experienced researchers) found the topics listed on sheets too broad and mainly pertaining to policy spheres; therefore, they often found it difficult to develop the topics into proper research questions. These participants found the method at this particular stage to be inefficient, although other participants felt the opposite. As the work proceeded from very large sets of ideas to more concrete research projects as the final output, the effectiveness of the process became recognizable.

2. Threat of losing ideas: Workshop participants felt, in addition to those few ideas that were selected for further development, that attention should be paid to the other unselected ideas. Many recognized that the method can leave out valuable ideas and that a way of improving the process of selection would be to sort all the ideas produced in the initial phase of the workshop into different categories; by doing this, in addition to identifying only the most feasible ideas, others that are inspiring or striking in nature could also be uncovered for consideration.
3. Schedule and facilitation: The overall schedule was considered well planned, but workshop participants felt that more time could have been devoted to proposal writing and wrapping up group work; many felt that workshop duration of two full days would have been ideal. The night between the different phases of ideation was regarded as important as rest and sleep allowed the unconscious elaboration of ideas. The joint dinner in the evening was also thought to be useful in terms of networking and creating good atmosphere.

   Joint dinners or other types of relaxation activities are an important part of ensuring productivity, especially with respect to conceptually demanding exercises such as these workshops. Intensive brainstorming, along with producing and debating ideas was very strenuous for the workshop participants. It was observed that people got more and more tired in the final session of the first day, at which point the (reorganised) groups visited 13 different research idea presentation stations. At this point, there was noticeably reduced input, as participants became more and more exhausted.

   In addition, participant feedback acknowledged the role of (good quality) facilitation as an important condition for the success of the process. In Edinburgh, an experienced facilitator was used; in addition, each group was assigned a group facilitator who abided by a set of specific facilitation instructions.
4. Post-workshop activities: Participant feedback also touched upon the importance of providing space for the continuation of work after the workshop. This was a topic that already concerned participants from the start of the workshop. They wanted to know how their input would be used and if their efforts would be worthwhile to the process. Stakeholder (non-scientific affiliated) participants emphasized their wish to be also involved in the less formal discussions between meetings. Transparency of the process was valuable in terms of building trust. The lack of formal calls for funding applications on which project proposals could have been designed, was for many participants an issue, particularly at the beginning of the workshop; however, as the workshop continued, it became clear to people that process had to be appreciated for the benefits it provided: networking, learning new ideas and developing research plans.

5. Applicability of the method: In particular, the method was seen as applicable in stakeholder discussions as well as incorporating stakeholder views in research. Stakeholder participants found value in the method for themselves and their own work, and not only as a means of contributing to the research-oriented activities. Many felt that they could apply the ideas generated during the workshop in their other projects, beyond the BE/BD pilot. The fact that the stakeholders represented many different bodies– government, NGOs and companies– was seen as beneficial. While the stakeholder participants were all from the same country, their participation could contribute a unique set of perspectives and experiences to the workshop.
   In the beginning of the workshop the stakeholder participants were especially interested in knowing how the exercises would be framed, particularly if there would be more emphasis on research topics than on policy processes. The starting point of the exercise was deliberately kept open to allow opportunity for both research and policy-focussed topics, which clearly satisfied these participants. However, tensions between theoretical and practical views surfaced occasionally during the workshop, but did not obstruct collaboration. This would indicate that the process was a success, balancing relevant and challenging issues for all participants.

8.2

Lessons learned from the proactive interdisciplinary dialogue

The most important findings and lessons learned from the pilot process are summarized in table 8 below. Each point will be discussed and elaborated in the remainder of this section.

Table 8. Summary of experiences gained in the pilot

1. The development of genuine and novel ideas is sensitive to the method: The method applied seemed to produce a significant number of research ideas in a relatively short time. However, a focussed working method easily reduces the diversity, risking the loss of novel openings. To overcome this problem we suggest the categorization of ideas based on their novelty and focus.
2. The method identified knowledge needs, generated project proposals and provided a fairly rapid and cost-effective way of conducting interdisciplinary and even transdisciplinary syntheses of existing knowledge on complex and emerging issues linked to biodiversity conservation.
3. The pilot made the existing networks of ALTER-Net less fixed and opened up a process of regrouping. The process also attracted social scientists as well as others who are new to or have not been active in ALTER-Net.
4. The method proved to be useful in engaging users of scientific knowledge as well as stakeholders in the planning of research activities, therefore increasing the effectiveness of research.
5. Developing interdisciplinary research ideas is a time-consuming process. The pilot included phases to keep the working groups together, while also offering new members the possibility of joining the teams. Extending the work through time, in a series of workshops, helps to elaborate the ideas and create in-depth understanding and integration.
6. The method can help ALTER-Net to become more proactive in relation to funding strategies. It can be used as a strategic tool to generate ideas and influence research programmes and future calls for funding.
7. The method was useful in facilitating both internal discussions within bigger organisations and international discussions between researchers, stakeholders and other groups.
8. The method could be used to create greater awareness of emerging issues.

Novelty of research ideas

The method applied seemed to produce a significant number of research ideas in a relatively short time, but only a few of these ideas were selected for further development. Hence, the method allowed for a diversity of ideas, but focussed attention on selecting those ideas that would be lead to the establishment of projects in common. The bottom-up way of working ensured that during the initial phases fresh and potentially novel ideas emerged. However, the pressure to produce focussed research proposals that resonate with the thinking of a large number of participants led to a process where a significant number of ideas were excluded. This is a paradoxical feature of interdisciplinarity: when the focus is on the smallest common denominator and there is an aim to build common understanding, diversity is lost. In particular, this trend can be detected in consensus-seeking methods. For instance, in a process involving a US-based environmental science community that was asked to form a consensual idea of the world's most pressing environmental problems to prioritize and focus funding (see Cabrera et al. 2008), the focussed dialogue paradoxically tended to strengthen (instead of extend or broaden) existing ways of thinking.

Loss of diversity has two implications. First, the process of exclusion and inclusion of ideas involves power relations: Who decides which ideas are important and who dominates the process? Domination of one or two fields of science can reduce the motivation to achieve a common project for other participants (e.g., Endter-Wada et al. 1998). Second, there is a risk that really novel openings are lost: the smallest common denominators between various perspectives tend to be those ideas which we are already accustomed to. Potential to develop cutting-edge research or to solve pressing problems may be lost. Especially, the creation of policy agendas in this way is problematic because it may fail to produce new information for decision makers to use– or help them see the value of taking into account contradictory information. Contradictory and uncertain knowledge may be important when there are complex environmental issues to be tackled, but it may be just as easily be set aside (see Hinchliffe 2001 for an account of Britain's BSE crises, a consequence of the policy community not being able to take uncertain and contradictory knowledge into account).

To explore the process from this perspective and to avoid the problem of diversity loss, we tried to find ways to utilise the large body of ideas. First, we brought the long list of ideas to the participants of the LTER Europe conference (approximately 50 delegates took part in this session) and asked them to mark ideas they found relevant for LT(S)ER sites (see table 4). Two of the three most popular ideas chosen by this group were closely linked with those ideas chosen for further development by the Edinburgh workshop participants. However, the LTER community also picked ideas that the Edinburgh participants rejected. An example is the topic concerning the link between biodiversity and alien species. This test proved that the variety of ideas could be more efficiently utilized.

The test also indicated that the selection of ideas is sensitive to the method used: in the Edinburgh workshop, we asked the participants to select useful and feasible ideas, whereas at the LTER conference we asked the participants to indicate LTER relevant ideas. To develop the method further, towards one that builds more on the diversity of ideas and that feeds proactive dialogue between the discussants, we suggest that the ideas produced in the first phase of workshops be categorized before being selected for further development. The following categories are recommended:

1. feasible ideas to make allowances for both academically-important and policy-relevant ideas
2. already researched ideas that can or should be approached from new perspectives
3. contradictory ideas to identify ideas widely debated in academia or the importance of which cannot be agreed upon by workshop participants
4. 'outrageous or wild' ideas to make room for unexceptional, even incomprehensible ideas, that are nonetheless intellectually attractive.

We suggest that the working groups choose an idea from each group to be developed further. This approach would draw the more difficult ideas into discussion, to facilitate mutual learning.

Mobilisation of expertise

The method supported the identification of knowledge needs and generated project proposals but also provided a fairly rapid and cost-effective way to conduct transdisciplinary syntheses of existing knowledge on complex and emerging issues linked to biodiversity conservation. As the process included participants that came from non-research organisations, it provided for transdisciplinary collaboration.

For the conduct of the BE/BD pilot, it was important that participants were mobilized from different WPs. In this way the pilot made the existing networks of ALTER-Net less fixed and opened up a process of regrouping. A prerequisite for this was that the task given to the participants be rather open (only the bioenergy-biodiversity interlinkages topic was defined) and not based on any given scientific approach. The process also attracted social scientists, and many of those who were not already active in ALTER-Net. The topics discussed during the Edinburgh workshop remained rather broad and policy-oriented. Interestingly, comparison can be made to a process in which policy makers and academics were brought together to identify policy-relevant ecological questions in the UK (Sutherland et al. 2006). The process is reported to have favoured general questions instead of narrow, specific questions typical in science. Some of the Edinburgh workshop participants argued that this bias would favour social scientists and practitioners who are more familiar with policy processes. For ecologists such framings of topics do not necessarily provide the easiest entry, but for more policy-oriented participants the way topics were structured ensured that outputs do not evolve at a distance from policy maker needs. The method is thus challenging for all participants.

The final outputs in the form of the four research topics (of which topics 2 and 3 were merged for the Vienna workshop) do show that some level of interdisciplinarity emerged. The combined project outline developed by Group 2 (sustainability indicators) does have ecological and social components present. The topic could be described as multidisciplinary, which means that the same overall problem is approached from different disciplinary perspectives. The fourth project idea that focuses on the impacts of EU policies outside Europe also has some elements of interdisciplinary research, with different disciplines providing input to an integrating (land-use) model. However, a challenge is to avoid a too totalizing modelling approach, which would not abandon support of diversity and pluralism that are among the strengths of interdisciplinary research. Topic 1 (multi-level governance) has evolved towards being a mainly social science research idea.

One of the benefits of the method was that it also supported the engagement of younger colleagues. In particular, this was achieved through the principles of open ideation emphasising a 'no criticism' rule while working through the first stages of the process. A remaining challenge is to mobilize people who would not normally find themselves experts in the field of the topic, but whose input might be substantial.

One possibility of effecting this, is to first hold workshops at the organisational or national level.

Importantly, the method proved to be useful in engaging stakeholders and users of scientific knowledge in the planning of research activities. From the participant feedback, it can be concluded that the stakeholder participants not only provided input to the process, but were also able to transfer ideas back to their organisations. This implies that the method supports communication between researchers and stakeholders. The method may also improve the effectiveness of research results when stakeholders have been involved in the early stages of research. To tap into this possibility as the process continues, is a challenge now that the process has evolved to the phase of the actual writing of project proposals. In other words, the process has moved into the researchers' domain. For instance, in the Vienna workshop where the final research topics were further developed, none of the stakeholder participants were involved; they have, however, remained in email contact with their teams. Their input would still be needed to ensure that their knowledge needs accounted for. Partly, their input given in the Edinburgh workshop 'extends' their participation even without their actual physical presence in the follow-up workshop, but any re-framings taking place might minimize the later use of their input.

Results

Developing interdisciplinary research ideas is a time-consuming process. Therefore, ideation or brainstorming is not enough and further steps are needed. It is essential to pay attention to how the research teams formed during the ideation process can be kept together. During the BE/BD pilot this was achieved by assigning the groups a task to produce material for the website and by organizing additional possibilities for the groups to meet (i.e., the Vienna meeting and Leipzig conference). Extending the work through time, in a series of workshops, helps to elaborate the ideas and create in-depth understanding and integration. The topics were also opened to non-workshop attendee colleagues.

Applicability

The BE/BD pilot showed that the method and the IDR framework can be applied in different ways.

First, the method can help ALTER-Net to become more proactive in relation to research funding strategies. It can be used as a tool to generate ideas and influence research programmes and future calls for research and funding. This could be done either by engaging relevant actors in the process of planning the research or communicating the results of such a process.

Second, the working method was useful both in facilitating internal discussions within bigger or fragmented organisations and national or international level discussions between researchers, stakeholders and other groups. These two working contexts can also be combined to get the best possible results.

Third, the method can be used to raise greater awareness of emerging issues. The method efficiently produced a synthesis of ongoing research on bioenergy/biodiversity interlinkages, and this synthesis can be used to communicate emerging environmental policy issues to the wider public. For example, the results from the literature review and Helsinki meeting were published in an article in a major Finnish newspaper *Helsingin Sanomat*. The webpages are also crucial for communication, as they can be referred to as a source of information in more general or focussed articles or oral presentations.

9 Conclusions: the interdisciplinary research framework as a part of knowledge production and transfer and ALTER-Net's future

Author: Eeva Furman[26]

Testing the model of the IDR framework through the BE/BD pilot showed that the framework is applicable in practice and that there is a need for a process that can deliver outputs such as those that derive from the IDR-framework. Stakeholders such as the EC (ALTER-Net assessment, June 2008) and the ALTER-Net advisory board (ALTER-Net advisory board meeting, April 2008) indicated that the IDR framework could indeed enhance the science–policy interface and evidence-based decision-making. The value of the IDR framework lies, according to the stakeholders, in its potential to bring various experts and stakeholders together to pool their knowledge, to produce interdisciplinary syntheses of scattered knowledge in a fairly rapid and cost-effective way, and to generate sophisticated research questions based on the knowledge needs identified in the process. The methods used in the BE/BD pilot were new to many of the participants, and based on their feedback the experience was indeed a pleasant surprise and discovery. There was a lot of buy-in for the IDR framework from researchers as well as stakeholders who attended the interdisciplinary workshops.

The many lessons learned (described in chapter 8) should be studied carefully when implementing the IDR framework in other contexts in the future. The use of the IDR framework should not be restricted to ALTER-Net only. The framework can be applied in many contexts and on many levels: organisational, local, national, supra-national and global. For example, using the IDR framework when developing research strategies for LTSER platforms could combat many of the challenges of interdisciplinarity that is currently experienced in many of the platforms. The use of the IDR framework, however, always requires tailoring, whether it is used within ALTER-Net or other settings, to be able to retain quality and cost-effectiveness. Several factors must be taken into account: the urgency of the planning process; the use and users of the process and outcomes; the substance of the topic, including its depth, scope and complexity; and resources available.

The IDR framework for identifying knowledge needs does not solely fulfil the required research contribution to biodiversity governance. It has to be fitted into a broader framework of knowledge production and communication in ALTER-Net. This ties the IDR framework to other required elements, such as raising upcoming issues that need to be tackled by the IDR framework (*think tank*), ensuring that the identified interdisciplinary research plans materialise as real projects which provide the needed outputs, and maintaining active links to key actors in research and conservation. The framework requires regular self-evaluation to keep it dynamic towards changes in the network of knowledge. The IDR framework within the broader framework of knowledge production and communication in ALTER-Net is shown in fig. 5. A detailed description of the various steps follows after the visual.

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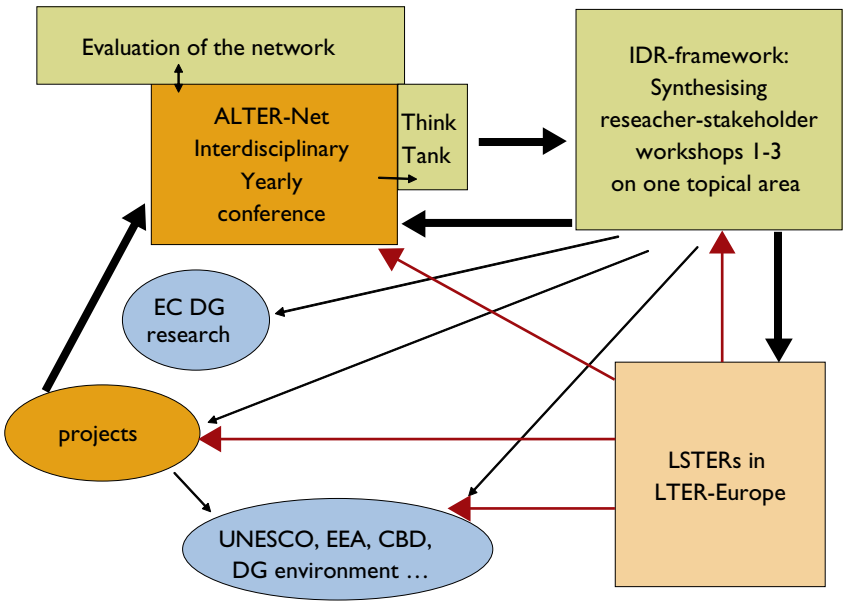

Fig. 5. Linking of the IDR framework to the broader ALTER-Net framework of knowledge production and communication

1. The process starts with an identification of issues with emerging knowledge needs. This takes place in a think tank that meets once a year, preferably back to back with an ALTER-Net conference, where new insights have developed. The think tank could consist of both young and more experienced researchers of ALTER-Net as well stakeholders. The think tank would deliver their suggestion to the ALTER-Net Council. A topic to be fed through the IDR framework could also be suggested by any other ALTER-Net organisation or stakeholder for consideration by the Council.
2. Once the topic has been decided upon, task force leaders and members are identified. The task force takes over the responsibility of coordinating the process and ensuring the development of an action and communication plan. It is not essential for the entire task force to have expertise in the topic that is being scrutinized. It is sufficient if one or two members of the task force do have knowledge in the field or are familiar with the debates in the field. Importantly, the task force members should have expertise, or develop or utilize the skills needed, in the working method (facilitation of the dialogue) as well as in the communication and the maintenance of web pages.
   To secure the widest possible participation throughout ALTER-Net, each participating organisation should name a contact person separately for each process based on the choice of the topic. The role of the contact person is, in co-operation with the task force, to communicate the activity in their own organisations, to identify relevant experts from their organisations, and to form a network to carry out activities and produce deliverables.
3. One of the first steps is to develop a communication plan, including creating a website, and identifying and contacting relevant stakeholders. They could be partly the same as in the ALTER-Net think tank but mainly experts of the topic in question. Policy makers, managers, members of the private sector as well as actors of broader society are among stakeholders to be considered. The stakeholders should also include research donors, as one of the aims of the framework is to identify knowledge needs and provide research ideas that could be used as raw material for research donors such as the EC DG Research and many ERA-Nets when planning calls for programmes.

4. A desk study of the topic is needed in an early phase. The material and the approach should serve the context, but the DPSIR approach should be considered as a useful approach when drafting the outline for the study.
5. One of the cornerstones of the process is to succeed in mobilizing researchers from as many partners as possible and having all relevant disciplines involved. The challenge lies in the fact that many needed specialists do not usually associate themselves with the biodiversity context. The organisation-specific or national workshops can help find and mobilize researchers and local or national stakeholders, but also gather useful knowledge for the process. The activity should engage task force members or organisation contact persons.
6. The sequence of organisation or national level workshops would then be followed up by an international ALTER-Net workshop, also bringing together researchers and stakeholders from different disciplines and organisations, albeit at a regional and even global scale. The pool of researchers from all ALTER-Net partner agencies will enable broader coverage of the disciplines at the international workshop than those carried out at the organisation level, this due to the likelihood that the broad spectrum of expertise needed is not found in the single organisations themselves. The international workshop would also bring together stakeholders from the local, national and international levels to jointly work on the topic with researchers.
7. The workshops should be planned for a duration of two full days, to be able to properly apply the methodology of interdisciplinary dialogue which proceeds from hundreds of ideas to a dozen of focussed ideas and finally to a handful of research plans. The second day could be fully used for the development of research plans into concrete research proposals. The process would further benefit from being taken forward in a sequence of weeks or months.
8. As one part of the communication plan, the task force identifies the various outputs as well as the users of the knowledge gained.
   a) The outcomes should be presented in a synthesised document to stakeholders and in academic papers to the scientific community. In some cases, the topic might direct the communication to a clear process; examples of this kind include the ad hoc TEEB process or the continuous EPBRS process. The concrete dissemination platform is the annual ALTER-Net conference, where the ALTER-Net Council, the stakeholder think tank and the entire community could be communicated with at once and where the use of substantive outcomes but also the effectiveness of the framework implementation is under scrutiny in the form of an evaluation.
   b) As the process generates project proposals, the ALTER-Net Council may want to implement some of them itself. The proposals are, however, mainly directed at external research donors. The ALTER-Net Council should ensure that the identified research plans become available to research donors.
9. The IDR framework brings researchers and stakeholders together. Contacts with key bodies of biodiversity conservation and biodiversity knowledge production and transfer should not be restricted to the identification of research needs but branch out into other frameworks of research and its management. From the conservation perspective, key roles are played by the EC DG´s Research and Environment as well as international governmental and non-governmental conservation organisations. The translators of research such as the ECNC and many biodiversity focussed consults should be included.
10. LTER Europe is an important network for implementing the projects and thus, its role should be considered in various phases of the process and in the process' communication strategy. The LTSER platforms provide a unique setting for carrying out interdisciplinary research of this kind. Therefore, invitations to the lead of LTER Europe as well as the LTSER platform managers

to participate in or observe the different working phases should be planned for. Similarly, ALTER-Net should pay an active role in delivering its ideas at the LTSER sessions of the LTER Europe annual conferences. Ideally, the two communities should meet from time to time, and even jointly organise their conferences.

11. Finally, the role of the ALTER-Net Council should not be underestimated in ensuring that the projects identified materialize to provide useful knowledge to decision-making. This could be facilitated by providing opportunities to allocate resources into the joint writing of funding proposals, for workshops and for carrying out background studies.

ACKNOWLEDGEMENTS

The editors would like to thank the organisers of the workshops, Katie Bates and Nicola Thompson at CEH and Simron Singh at IFF and participants of the workshops, interviewees of the evaluation, those leading the development of research plans as well as the ALTER-Net research community at large. Pekka Jokinen, Raimo Heikkilä and Saija Miina and two reviewers provided valuable insights comments to the manuscript and reviewers. Karen Heikkilä did the language check. Janne Rinne and Janne Heliölä made a major contribution by maintaining the website and completing a literature review. Saija Miina is acknowledged for her work as facilitator of the Edinburgh workshop. Marja-Leena Kosola kindly helped with the interviews. Major contribution into the report was made by the authors of the chapters, Rob van Apeldoorn, Vineta Goba, Zita Izakovicova, Julia K. SteinbergerBerien Elbersen, Janne Rinne. The study was supported by the European Union within the FP6 Network of Excellence ALTER-Net (Project no. GOCE-CT-2003-505298).

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Annex 1. The plan for enhancing interdisciplinary research and providing directions for the Memorandum of Understanding of ALTER-Net II (the IDR-plan)

Eeva Furman

Goal 3. Methods, tools and policies for improvement and cost-effective management of biodiversity (Eeva Furman, RA4, SYKE)

Brussels: Provide a synthesis of outcomes from various interdisciplinary activities carried out under separate WPs; including a compilation of experiences.

This document outlines activities of ALTER-Net during the period October 2007-March 2009 which enhanced interdisciplinarity or outlined future directions of interdisciplinary work and organizational integration in ALTER-Net II.

Mandate for the period:
Due to the complex nature of biodiversity issues, different methods and concepts have to be used to provide policy relevant understanding of ways to safeguard biodiversity. During the given time period, ALTER-Net will draw together the knowledge developed in various activities with the aim to strengthen the capacity of the ALTER-Net to carry out high quality inter-disciplinary research through partners´ integrated action. This also will be reflected in the annexes of the Memorandum of Understanding of ALTER-Net II.

Overarching goal:
A research community which is capable of conducting interdisciplinary research that tackles European-wide problems and issues related to halting the loss of biodiversity.

Three areas of activities envisioned:

- Developing interdisciplinary research capacity;
- Producing high impact papers demonstrating improved biodiversity research capability;
- Supporting activities.
-

A. DEVELOPING INTERDISCIPLINARY RESEARCH CAPACITY

There are five broad interdisciplinary activities which aim to develop interdisciplinary research capacity for ALTER-Net. The first one (A.1) links all work packages together, the others (A.2-A.5) support the development of the community, concept and methodology mainly through the approaches of specific ALTER-Net WPs.

A.1. An IDR research community (Eeva Furman & Taru Peltola, RA4, SYKE)

Objective:
To develop capacity for interdisciplinary syntheses with stakeholder participation

To support the growth of an integrated ALTER-Net community for interdisciplinary research, approaches for problem-oriented, interdisciplinary biodiversity syntheses will be developed.

The different approaches can be presented in a framework which will cover issues such as

- The identification of the problems and questions together with stakeholders with different interests and expertise from local, national and EU-level;
- The identification of specific knowledge needs;
- The identification of data needs and specific research tasks;
- Planning communication for interdisciplinary research.

The process of developing a framework will strengthen ALTER-Net's capacity to carry out innovative biodiversity research and policy relevant analyses for the EU.

Rationale: *By drafting an ALTER-Net wide interdisciplinary synthesis that outlines current knowledge and future research within a topical area experiences will be gained for developing the framework*

The ALTER-Net wide interdisciplinary synthesis will be focused on bioenergy. Bioenergy is a hot topic throughout Europe with strong backing from the Commission[1]. The links between bioenergy development and biodiversity conservation are many and complex. There is a need to demonstrate that biodiversity research can contribute in a proactive way to the ongoing debate. Bioenergy and biodiversity is therefore an excellent area for ALTER-Net to demonstrate its integrated strength in producing interdisciplinary analyses.

The synthesis should demonstrate

1. An ability to formulate problems and questions in such a way that they are both scientifically challenging and relevant for policy development;
2. An ability to see possibilities for novel combinations and syntheses of research carried out so far;
3. An ability to outline a research plan that is based on points 1. and 2.
4. Ways of soliciting views of stakeholders for the work;
5. Ways of combining long-term research efforts with delivery of advice for short-term (policy) needs;
6. The strengths of an integrated research effort carried out in different organizations across Europe.

Based on the specific synthesis related to the bioenergy-biodiversity relationships a general framework can be provided that would support the preparation of interdisciplinary biodiversity research in other areas as well. The framework will also draw on the experiences gained in the other interdisciplinary research activities of the ALTER-Net.

Process:

The tasks are:

1. Outline the problems to be analysed and the more specific knowledge needs of the bioenergy-biodiversity relation.
   - Form a task force, lead by Taru Peltola (supervised by Eeva Furman) and facilitated by RA4, members include representatives from other WPs;
   - Task force outlines the problems to be addressed, uses other WP researchers where needed;

[1] Already the white paper COM(97) 599 final Energy for the future - renewable sources of energy noted: "Bioenergy is among the most promising areas within the biomass sector, and combined heat and power using biomass has the greatest potential in volume among all renewable energies. Consequently, a campaign to promote and support decentralised biopower installations throughout the European Union is essential. Such installations could range in scale from a few hundred kW to multi-MW and combine different technologies, as appropriate to local circumstances, including fuel switching. http://ec.europa.eu/energy/library/599fi_en.pdf [28.8. 2007]

- Task force organizes stakeholder workshops with stakeholders representing local, national and/or EC level with different expertise and a mix of various nationalities?[exact composition and nature of stakeholder meeting will depend on specific problem areas] to discuss specific knowledge needs and research questions.

2. Specify issues to be addressed and formulate specific questions for the synthesis.
   - Based on the input from 1 task force specifies the problem and the questions for the synthesis;
3. Develop the interdisciplinary synthesis
   - A workshop for ALTER-Net partners is organized to
   - Scan what data exist to respond to the key questions identified
   - Explore what different partners can contribute in terms of data and analysis
   - Identify need for novel type of research and interdisciplinary interactions
   - Based on the outcome of the workshop and other input the task force edits the synthesis on the biodiversity-bioenergy relations, including an outline of future research.
4. Test the synthesis through survey/interviews with key stakeholders
   - Policy relevance;
   - Unanswered questions;
   - Feasibility of identified research needs and general research plan.
5. Analyse the process of developing the synthesis.
   - The process of developing the synthesis is analysed throughout the process;
   - Obstacles and criteria for success are to be specified;
   - The outcomes and synthesized by
6. Provide a generalized framework for developing integrated interdisciplinary research in ALTER-Net

Forms of participation:

- ALTER-Net partners can participate in the work by
- Participating in the task force that leads the planning and editing via WPs
- Participating in the workshops
- Identifying and providing contact details for researchers who can provide information on the availability and need of data, and on (ongoing) research in the partner organization that is relevant for the synthesis questions specified by the plan for bioenergy-biodiversity research (irrespective of whether the research has been included in the ALTER-Net WPs so far).

Requests to WP leaders:

- Find and nominate persons to participate in task force
- Develop creative ways of interacting between the task force and the WP

Timing

- National workshops April – December 2008
- Alter-Net parties and stakeholders´ workshop 20-21.10 in Edinburgh
- Potentially 2nd all parties workshop January 2009

Deliverables:

1. An interdisciplinary synthesis of the state of the art of the knowledge of bioenergy development and biodiversity, including an outline of future research.
2. A general framework for developing interdisciplinary syntheses in the biodiversity field.

3. Joint application e.g. to EU framework call
4. A website for communication

Assessment (March 2009):

Contribution to interdisciplinarity within ALTER-Net:

- has piloted the interdisciplinary capacity within ALTER-Net and delivered a framework for future identification of research needs and for the development of interdisciplinary syntheses of complex issues which are relevant for decision making in biodiversity conservation

Deliverables:

1. Furman et al. (2009). Towards a European interdisciplinary research framework for identifying rapidly arising research needs in biodiversity conservation - bioenergy-biodiversity inter-linkages as a case. Finnish Environment x.x.
2. A proposal for ALTER-Net to implement the IDR-framework with ecosystem services.
3. Website: www.environment.fi/syke/bioenergycase

Other notes:

No joint proposal submitted directly as a result of the IDR-plan to the Commission

A.2 Systems and tools for policy conservation options (Flemming Skov NERI, RA6/Mihai Adamescu RA4, UNIBUC)

Key objectives:

- Developing a tool based on Fuzzy Cognitive Mapping for participatory model building
- Developing methods for participatory knowledge acquisition and public involvement
- Development of an action plan for the use of the methodology in other LT(S) ER sites in a number of ALTER-Net countries
- Presentation of results in a join publication (report and scientific paper)

Approach:

The idea of using Fuzzy Cognitive Mapping (FCM) for participatory model building has been developed and tested at a workshop in Poland. The preliminary results show that the use of FCM stimulated discussion and promoted social learning. The process, however, is not without caveats the methodology needs further development and refinement.

Participants:

Most ALTER-Net institutions involved with RA4 and RA6 could be involved, but NERI and SYKE will lead.

Timing:

- Jan./Feb. 2008. Local co-ordinators for each LT(S)ER site to be appointed and startup workshop conducted
- Feb./Jun. 2008. Field work; analysis of results
- October 22-24, 2008. Presentation of results at workshop for all participants.

Deliverables:

1. Guidance for application of fussy cognitive mapping in integrated identification of knowledge needs on local level

Assessment (March 2009):

Contribution to interdisciplinarity within ALTER-Net:

- The aim was to identify the research needs in complex environments (LTSER platforms) and also integrate the local knowledge in the research framework. FCM was tested in order to see if this tool could help better identify and acknowledge the importance of considering local knowledge in designing both research agendas as well as developing management and conservation plans.
- Gain direct understanding of the challenges faced in integrated management planning in complex environments
- Identify research needs in facing these challenges

Deliverables:

1. Methodology for collaborative identification of knowledge needs for integrated management
2. Synthesis of inventory of knowledge needs, gaps, uncertainties for Alternet research framework
3. Manual for applying Fuzzy Cognitive Mapping – experiences from ALTER-Net (Kirsten G.Q. Isak, Martin Wildenberg)

A.3 Tools for assessing public attitudes (Anke Fischer, RA5, the Macaulay Institute)

A.3.1: A quantitative approach to understanding public attitudes towards biodiversity management

Key objectives:

- Developing joint research methodology to assess and understand public attitudes
- Developing joint research agenda, creating a basis for long-term social research
- Delivering an indicator of public opinion (→ CBD), Common and agreed qualitative and quantitative methods to assess public attitudes.

→ Thoroughly test the methodology developed in previous phases to assess public attitudes towards biodiversity management and change across Europe, including a strategy to obtain funding for a large-scale (and possibly long-term) application of the survey instrument

Approach:

During the last two years, RA5 jointly developed a quantitative approach to assess and better understand public attitudes towards biodiversity. A questionnaire has been developed, pretested in eight countries, and is now being pilot-tested in eight countries (Romania, Slovakia, Hungary, Austria, France, Flanders, Netherlands, Scotland) with target sample sizes of n=300 in selected (LTSER) areas in each country (i.e. a sample size of 2400 completed questionnaires overall). As ALTER-Net funds were not sufficient, co-funding has been sought by each of the partners. While this pilot survey will lead to an improved survey instrument which in the future can be

used for large scale applications, it will also produce empirical results that will be written up and published in peer-reviewed journals.

Participants in the pilot survey
(the survey instrument has been developed by the entire RA5 group!): Macaulay Institute (Anke Fischer), CEH (Juliette Young), Alterra (Fransje Langers, Arjen Buijs), INBO (Lars Hegemann, Myriam Dumortier), Cemagref (Isabelle Mauz), UniBuc (Nicoleta Geamana, Oana Musceleanu, Petru Lisievici), ILE-SAS (Marta Dobrovodska), IEB-HAS (Istvan Tatrai), Umweltbundesamt (Birgit Friedl, Ines Omann).

Timing:
- Fieldwork September - December (Scottish questionnaires have been sent out already, the others follow as we speak)
- Workshop to discuss strategy for data analysis and publications/ dissemination: October 24
- Joint analysis, publications and dissemination: January onwards

Deliverables: articles and reports, see section B

Assessment (March 2009):

Contribution to interdisciplinarity within ALTER-Net:
- Brought in an explicitly social scientific component to the otherwise quite ecology-centered network
- Developed questionnaire and study design together with ecologists and conservation biologists in the RA5 team and communicated principles of social scientific research to a multidisciplinary team (RA5) and also to a wider audience (ALTER-Net community)
- Brought together social scientists from different disciplines (psychology, sociology, economics, human geography) to work together on a joint project

Deliverables:
1. Questionnaire and fieldwork strategy (see Lynx)
2. Report – summary findings – published on www.alter-net.info: Bednar-Friedl, B., Buijs, A., Dobrovodská, M., Dumortier, M., Eberhard, K., Fischer, A., Geamana, N., Langers, F., Mauz, I., Musceleanu, O., Tátrai, I., and Young, J.: Public views on biodiversity change – a study in eight European sites. Report to the ALTER-Net NoE. Available: www.alter-net.info
3. Book chapter for LTER book edited: Bednar-Friedl, B., Buijs, A., Dobrovodská, M., Dumortier, M., Eberhard, K., Fischer, A., Geamana, N., Langers, F., Mauz, I., Musceleanu, O., Tátrai, I., and Young, J.: Public views on biodiversity change – a study in eight European sites. Book chapter submitted to Krauze, K., Mirtl, M., and Frenzel, M., (eds.): LTER Europe – the next generation of ecosystem research.
4. 4+ workshop and conference presentations on key findings:
   a. at workshop on Marine Invasive Species, University of Bergen, February 20, 2009
   b. at ALTER-Net conference, Leipzig, March 2009
   c. at LTER conference, Mallorca, December 2008 (held by Eeva Furman)
   d. at ALTER-Net workshop in Edinburgh, October 2008.
5. Co-authored manuscript: Fischer, A., Langers, F., Bednar-Friedl, B., Geamana, N., and Skogen, K.: What informs attitudes towards animal

and plant species? Results from a survey across Europe. Submitted on November 28, 2008 to Journal of Environmental Psychology.

6. Co-authored manuscript: Mauz, I., Fischer, A., Langers, F., Young, J., Bednar-Friedl, B., Grünberger, S., and Musceleanu, O.: Biodiversity changes viewed by European citizens: a complex picture, fed by embodied experiences. Submitted on February 28 to eco.mont (new journal)

A.3.2: A qualitative methodology to explore changes instigated by and related to the awareness of 'biodiversity'

Key objectives:

- To provide a better understanding of the concept of biodiversity, of how and by whom it is constructed - What characteristics are attributed to it, not only by scientists but by all those people who, for various reasons, adopt it?
- To identify and analyze what biodiversity does to certain practices, for example participation and knowledge production practices
- To jointly develop and test a common qualitative methodology
- Provide an opportunity for discussions with natural scientists and therefore foster interdisciplinary collaboration

Approach:

- Case studies in several (up to nine) countries where biodiversity is explicitly associated with participatory approaches, possibly in (candidate) LTSER sites (see also attached document)

Participants:

Isabelle Mauz (Cemagref), Taru Peltola (SYKE), Ketil Skogen (NINA), Dieter Rink (UFZ), Anke Fischer (Macaulay Institute), UniBuc (Nicoleta Geamana, Oana Musceleanu, Petru Lisievici), ILE-SAS (Marta Dobrovodska), IEB-HAS (Istvan Tatrai), Alterra (Arjen Buijs), et al.

Timing:

- Develop and concretize the approach in preparation for and at the workshop in Grenoble, October 25-26
- Develop case studies during 2008
- Publication and dissemination starting in autumn 2008

Deliverables: articles and reports:

1. LTSER under construction: scientific cooperation in practice. A sociological study based on a comparison between three sites as a book chapter for LTER book edited by Kinga Krauze et al. (in progress) Taru Peltola3, Bas Breman1, Arjen Buijs1, Céline Granjou2, Isabelle Mauz2 & Severine Van Bommel1 (1 Alterra, 2 Cemagref, 3 SYKE)

Assessment (March 2009):

Contribution to interdisciplinarity within ALTER-Net:

- Adds a reflexive element to the multidisciplinary work in ALTER-Net by looking at the way how researchers and other stakeholders produce knowledge (within and across disciplines) in LT(S)ER sites

Deliverables:

1. 2 conference contributions
2. report/paper in progress

A.4 Tools for prioritising socio-economic drivers (Cornelia Ohl, RA1, UFZ)

Key objectives:
To provide a conceptual tool for prioritizing drivers and pressures of biodiversity change.

Approach:

- **Development of toolbox and software programming**

The toolbox was developed in two phases. Phase I: Developed a user-friendly facility to provide information on criteria assessment. Phase II: Support decision making by providing a systematic risk assessment with reference to driver and pressure specific risk profiles

- **Finalizing software programming of the assessment tool:**

Integration of user profile, initiate systematic data collection and storage, and facilitate comparability between sites and/or studies.

- **Testing of the assessment tool**:

Assessing one driver at EU and local level, assessing one pressure at EU and local level

Participants:
Teodora Alexandra Palarie, University of Bucharest (10 days), Kinga Krauze, ICEPAS (5 days), Peter Bezák, ILESAS (10 days), Ayele Gelan, Macaulay (10 days), Cornelia Ohl (lead), UFZ (25 days)

Timing:

- Meeting (Leipzig, April 2008)
- Launching the web-based application of assessment tool (March 2009)
- Testing and completing of assessment tool (February 2008 to March 2009)
- Finalizing paper (April 2009)

Deliverables:

1. Workshops fostering integration of different disciplines and research cultures
2. Web-based application of the assessment tool including user-friendly tool
3. Paper prepared for submission to peer reviewed journal

Assessment (March 2009):

Contribution to interdisciplinarity within ALTER-Net:

- Three workshops fostering integration of different disciplines, research institutions, countries and research cultures (Leipzig, April 2008, Edinburgh, October 2008, Leipzig, March 2009)
- Web-based assessment tool is potentially useful for the LTER-Europe community.

Deliverables:

- Three workshops fostering integration of different disciplines and research cultures

- Web-based application of the assessment tool including user-friendly tool
- Discussion paper published (http://www.ufz.de/data/2_2009_Ohl_et_al_DAPSET10023.pdf)
- Poster presentation at ALTER-Net conference, Leipzig, March 2009
- Paper prepared for submission to peer reviewed journal

A.5 Inter-disciplinary modelling framework on DPSIR (Simron Singh, RA1, IFF)

Key objectives:
Developing a socio-ecological model based on DPSIR framework for policy and decision support in LTSER sites

Approach:
- Development of a model based on the DPSIR framework and integrates landscape-ecological indicators that are highly relevant to biodiversity and that could quite easily be extended to larger regions.
- Feasibility studies in terms of toy models for the LTSER sites Eisenwurzen, Donana and Danube Delta will be done.

Participants:
Simron Singh, Helmut Haberl, Veronika Gaube, Michaela Wiesinger, Simone Gingrich (UBA/IFF), Angheluta Vadineanu (UNIBUC), Ricardo Díaz-Delgado, Francisco Carro Mariño (Donana), Kinga Krauze (ICE-PAS).

Timing:
- Kick off in March 2008,
- Model development with short visits to the sites until summer 2008,
- Three toy models and one paper until December 2008

Assessment (March 2009):

Contribution to interdisciplinarity within ALTER-Net:
The conceptual model as well as the computer agent-based model integrates social and natural science by linking effects of changes in the socio-economic system (i.e. agricultural subsidies, agricultural product prices) on stocks-and flows (materials, energy, substances) of the natural system. The model helps to structure information on Drivers, Pressures and State and it helps to look at the dynamics and interlinkages between Drivers and Pressures. There is a potential to use such models within a stakeholder process and to serve as a decision support tool. It serves as an interdisciplinary method linking social and natural science towards research on biodiversity. These are the key conclusions from a methodological aspect.

Deliverables:
A conceptual model for all three case studies exist (i.e. statecharts for all relevant stakeholders, data, regional description). For the Eisenwurzen case study the computer simulation model with farmers as the main actors implemented is finished. First versions just for a first feasibility check for the other two LTSER sites Donana and IDD are currently in work and will exist by the end of March.

As deliverable a documentation of the whole model (data description, technical information) is currently in preparation.

B. PRODUCING HIGH IMPACT PAPERS DEMONSTRATING IMPROVED BIODIVERSITY RESEARCH CAPABILITY

B.1. Multi-site experiment (Stefan Klotz, RA3)

A publication will be produced based on jointly planned activities. The multi-site experiment deals with the importance of disturbances and the system responses on disturbances on a European scale.

Deliverable:

1. Prolongation of the multi-site experiment in 2009 and preparation of a manuscript on influences of mechanical disturbances on forest and grassland ecosystems across Europe

B.2. Effectiveness of interdisciplinary research: land use, climate change, Natura 2000 (Stefan Klotz, RA3, UFZ)

Key objective:
to analyse joint data on key aspects related to land use and climate change.

Approach:

- Study climate change signals in long term data sets using permanent plots: partners: Maccaulay, CSic, UFZ. Manuscript ready for publication in autumn 2008:
- The fate of old-field succession: floristically different developments show similar functional patterns: partners: UFZ, UNI Goettingen. Manuscript ready for publication in spring 2009,
- Biodivesity indicators in agricultural biomass production: partners; ILE-SAS, Uni Goettingen, UFZ. Manuscript ready for publication at the end of 2009.

Deliverable:

1. Development of a research strategy to study combined effects of land use and climate change in NATURA 2000 sites and in the cultural landscapes

B.3. Method for identifying and describing socio-economic processes that impact biodiversity (Kinga Krauze, RA2, ICE PAS)

Purpose:
All deliverables are to summarize and synthesise work done within WP R1 and other workpackages, which addresses the socio-ecological drivers and pressures of biodiversity. The task refers especially to proposed criteria for merging socio-economic and ecological research at long-term research sites (including both LTSER and LTER that intent to broad the research scope) (Ohl et al. 2007- task 1.R1.D4) and a mind-map regarding (perceptions of) political, economic, social and cultural forces behind biodiversity changes (3.R1.D3).

The purpose is:

- To provide AlterNet I, AlterNet II and LTER Europe sites with background information on methods and tools that can be used to merge socio-economic data/information and traditional approaches – basing on LTSER criteria/ themes developed in R1 and considering suggestions from other WPs;

- To help them (sites, research teams) in addressing major interdisciplinary, scientific issues highlighted by AlterNet teams as priorities for further socio-ecological research.
- To build a bridge between information produced by AlterNet teams on research priorities, recommendations, gaps and research implementation at long-term research sites
- To serve community with relevant literature and websites, which can be used beyond AlterNet as a guideline for biodiversity research
- To increase an impact of AlterNet on the wider scientific community as well as stakeholders and policy makers (e.g. raise an interest of UNESCO and UNEP).

Participants:
Aili Pyhälä (SYKE), Teodora Palarie (UNIBUC), Geta Risnoveanu (UNIBUC), Edit Kovacs-Lang (IEB-HAS), Martin Wildenberg (UBA/IFF), Ricardo Díaz-Delgado (CSIC), Chris Klok (ALTERRA)

Timing:
- Development of the report on a mind-map regarding (perceptions of) political, economic, social and cultural forces behind biodiversity changes into a paper highlighting the most urgent issues that needs to be tackle by the AlterNet / LTER community (April 08)
- Compilation of results from the report with theme list provided by task 1.R1. D4 and other AlterNet reports (May 08)
- Preparation of a list of tools, methods and references that best addresses the identified themes of socio-ecological research through contacting experts within AlterNet community and WP leaders (September 08)
- Delivering a report with relevant data-base (October 08)
- Developing of the report into a guideline (January 09)

Deliverables:
In progress:
1. A paper on "Developing a framework for socio-ecological research on biodiversity change at LTSER platforms" – based on results of 3.R1.D3 "Review of literature and 'mind map' regarding (perceptions of) political, economic, social and cultural forces behind biodiversity changes"
2. A paper on "Collation of existing ALTER-Net information on drivers and pressures, research needs and recommendations".
3. "A guideline on driver/ pressures relevant approaches and methods"

B.4. Methods for analysing long term biodiversity data using case studies (Mihael Mirtl, 13,)

Deliverable:
Mirtl et al. 2009: LTER-Europe: Enabling "Next generation ecological science"Full report on the first implementation phase of LTER-Europe under ALTER-Net & Management Plan 2009/2010

B.5. Innovative solutions in implementing Natura2000 (Frank Waetzold, RA4, UFZ & Rob van Apeldoorn, RA4, Alterra)

Key objective:
To analyze in an explorative way cost-effectiveness issues in management plans, as instruments of implementing the Birds and Habitats Directives as key European biodiversity conservation policy, in four countries (Germany, Finland, Poland and the Netherlands).

Approach:

- Because the analyses can not go in too much detail we will develop indicators which allow assessing whether a management plans is (more or less) cost- effective. By analyzing the processes leading to the plans we will identify the reasons behind the plans. We are keen to identify institutional innovations used to develop the management plans.
- The materials will be collected by interviewing two managers (at different levels of working) in each country.

Participants:
F. Waetzold (UFZ), R. Varjopuro (SYKE), T.J. Chmielewski (ICE PAS), F. Veeneklaas & R. van Apeldoorn (ALTERRA).

Timing:

- Materials have been collected and four country descriptions have been written. First analyses take place and a first rough draft of the paper is in discussion. Paper will be finished before summer 2008.

Deliverable:
Frank WÄTZOLD[a*], Melanie MEWES[a], Rob van APELDOORN[b], Riku VARJOPURO[c], Tadeusz Jan CHMIELEWSKI[d], Frank VEENEKLAAS[b], Marja-Leena KOSOLA[c.] Cost-effectiveness of managing Natura 2000 sites: An exploratory study for Finland, Germany, the Netherlands and Poland (submitted Feb 2009)

B.6. Can we use biomass from farmland, abandoned land, forests and nature conservation areas in synergy with biodiversity conservation?

(Berien Elbersen, Joop Spijker (Alterra), Dave Howard, Jeanette Whittaker(CEH), Lars Lundin, Ulf Grandin (SLU), Zita Izakovicova (SAVBA), Raiimo Heikkila(SYKE), Linda Meiresonne(INBO), Poul Henning Krogh, Pia Frederiksen (NERI)); I2, Alterra

Objective
In this report we investigate whether the renewable energy targets and the reduction of biodiversity loss are compatible. We focus especially on the question where and how biomass resources can be cropped and/or harvested without compromising biodiversity and what the main knowledge gaps are on which new research topics need to be focused.

Context
In January 2008 the draft Directive on the promotion of the use of energy from renewable sources was presented by the European Commission and in December of the same year it was approved by the European Parliament. It sets an overall target of 20% renewable energy to be reached by 2020 and a 10% target for biofuels in total transport fuel consumption. At the same time The European Sustainable Development

Strategy (SDS) emphasizes the importance to combat a further decline of biodiversity, the necessity of a sustainable management of natural resources and to stop climate change. According to the EU-SDS these objectives should be integrated in all policies of the EU including the energy, agricultural and forest sector. The strategy has set a target of halting the decline of biodiversity in 2010. The first progress report, however, expresses serious concern on reaching this biodiversity target, and recommends that forthcoming actions should include an overall strengthening of the integration of biodiversity impacts into policies and programmes.

At this moment there is still little understanding of whether realisation of the bioenergy targets can be combined with prevention of further biodiversity decline. Although estimating the exact amount of land required for bioenergy is difficult, it is clear that the pressure on land will increase strongly under a growing biomass demand. This may cause adverse effects on biodiversity as it may lead to the further intensification of existing land uses, both in agricultural and forest lands, but also the conversion of non-cropped biodiversity-rich land into cropped or forest area. The Directive states that biofuels shall not be made from raw material obtained from land with recognized high biodiversity value, such as undisturbed forest, areas designated for nature protection purposes or highly biodiverse grasslands. However, the big question is how this land resource is exactly defined and identified (e.g. mapped) and whether not being accountable to the renewable energy target provides enough protection to valuable ecosystems in markets offering very high prices to biomass feedstock.

Approach

Two questions will be answered in the paper:

- What options exist to increase the renewable energy potential from terrestrial resources in the EU in synergy with biodiversity conservation or without causing additional loss of biodiversity?
- What are the research needs for reaching an increased renewable energy share from terrestrial resources in the EU without compromising the present and future biodiversity values?

2 types of information sources will be used:

- A literature research providing a better understanding of the effects on biodiversity of land use changes and changes in management of different productive and non-productive land resources and an overview of the research state-of-play in relation to this topic.
- 7 EU country case studies executed according to a similar outline aimed at collecting (comparable) information on: policies/actions and present and planned stimulation measures for producing/consuming biomass based energy and accompanying sustainability and/or certification schemes including biodiversity conservation objectives, policies in relation to biodiversity conservation, present and future share of renewable land based-biomass based energy in total energy consumption, risks for and synergies with biodiversity from present biomass collection/production (if information available) and types of biomass based bioenergy projects that are in place/planned.

Report outline

First an introductory chapter. In the second chapter the scientific base for the rest of the study is discussed based on published and expert information. In Chapter 3 the national implementation of the bioenergy targets is discussed for the 7 case study countries and how this is linked to sustainability criteria, especially in relation to nature conservation. In Chapter 4 the real practice of biomass cropping and/or

harvesting for bioenergy purposes is discussed for the 7 case study countries. It will categorize the type of biomass harvesting projects identified and discuss the potential negative effects on biodiversity and the synergies with biodiversity.

In chapter 5 the 2 research questions are answered. The main conclusions are drawn of the findings in this study by especially focussing on the optimal use of biomass resources in synergy with halting biodiversity loss. Research gaps are discussed and recommendations for new lines of research are made.

Timing:

- Paper ready for submission end of March 2009.

Deliverable:

1. Elbersen et al (2009; in prep) Can we use biomass from farmland, abandoned land, forests and nature conservation areas in synergy with biodiversity conservation?

B.7. Benefits of biodiversity in combination with public awareness (Joke Luttik et al.), I2, Alterra)

Objective

The paper aims to provide an identification of landscape functions, including their spatial distribution, using a map of the Netherlands with nine major landscape types . Empirical studies are related to the landscape type map. This provides an overview of the spatial distribution of available estimates of landscape benefits by type of function.

First results show that all landscapes perform many functions, but some display exeptional accumulations; in particular sea and dunes landscapes are highly valuable. There are still huge data gaps; empirical studies are scarce and tend to be concentrated in particular landscapes. In addition, empirical studies vary in terms of methods and approach. The paper will briefly describe and compare methods, in order to assess how functions descriptions and value estimates from different studies and different methodologies should be interpreted and to what extent they are reliable, comparable, overlap, and/or can be 'added up', and to what extent benefit transfer (from a particular case study to different but similar regions) is feasible. The final step will be to ask experts in three other Western European countries (Denmark, Germany, Belgium and/or the UK) to reflect on the results and to compare them to the state of the art in their respective countries.

Timing:

- Paper ready for submission end of March 2009

Deliverable:

1. Luttik, Schrijver & De Bont: Nature and Landscape, Use and Appreciation measured in Money and Emotional Value

B.8. Climate change adaptation in combination with modeling (Eric Arets, Caspar Verwer, Rob Alkemade, Michel Bakkenes, Miguel Araújo, Flemming Skov, Jens-Christian Svenning and Risto Heikkinen); I2, Alterra)

Key objective:

Objective is to assess the effect of future climate change on biodiversity in Europe. The project is reviewing studies that used species distribution models (SDM) to assess differences in vulnerability to climate changes for different species groups

and different biomes. The effects of dispersal and modelling methods will also be accounted for.

Approach:
Based on a search with relevant keywords in Web of Science, 168 papers were selected for review. The majority of these papers, however, still mainly focus on methodological issues, rather than assessing the impact of different future climate scenarios on the distribution of species across Europe. The review is still in progress and if sufficient data are available, also a meta-analysis of the effects of climate change will be carried out. Based on the results from the reviewed papers the following trends can be distinguished:

- Current climate envelopes shift towards the North-East
- Loss of suitable climate space mainly occurs in Southwest Europe
- The dispersal range for tree species is reduced by 10-25%
- Alpine species are most vulnerable because of habitat loss, while plant species with wide distributions appear to be least vulnerable
- Mammalian species richness reduces in the Mediterranean but increases in northern regions
- Amphibians and reptiles with limited dispersal face high extinction risk, especially in the Mediterranean region
- Specialist species may suffer a mismatch between their distribution and the distribution of their recourses
- Butterfly species react rapidly on climatic changes
- Birds react differently, depending on migration capacity.

Review modeling approaches in Alternet with the current climate change models, make a subset of the most likely scenarios and try to pictures the direct influence on biodiversity, the direct influence on socio-economic activities and the impact on biodiversity following the changed pressures of those socio-economic activities.

Timing:

- Paper ready for submission end of March 2009.

Deliverable:

1. Arets et al (2009; in prep) Effects of climate change on species diversity in Europe

B.9. Booklet on integration approaches (Leon Braat, I2, Alterra)

Key objective:
To produce an overview of the approaches on integrated research within Alternet. Summarizing in small chapters the methodology (e.g. DPSIR-review, MORIS, review of approaches, etc.) and in others the integration of disciplines in thematic studies or case studies. Most of the work itself already will be completed in Alternet. In the booklet we aim to show these results in a logical order and coherence.

Participants:

- All I2 participants

Timing:

- To be finished by the end of the project (April 2009)

Deliverable:

1. Braat et al.: ‚Integration of natural and social sciences in biodiversity research, manuscript in progress

B.10. Do institutions for policy-science interface fill the knowledge gaps in understanding all the elements of the DPSIR? - biodiversity decision making as a case (Eeva Furman RA4, SYKE)

- Idea to use the outcomes from the report to the EPBRS on Views to bid research and the Analysis on knowledge needs raised in policy institutions and link it with other material from A-Net
- write on the science policy tools used and their potential to take into account the entire (and extended) DPSIR

Actors:

- Those who took part in the two reports are invited, also others to be contacted

Timing:

- Discussion started by email, first draft aimed for the October workshop

Deliverable:

1. Furman et al.: What could DPSIR-approach bring to science-policy in the context of biodiversity. manuscript in progress

B.11. A paper on rhetorics in biodiversity and its management (Riku Varjopuro, RA4, SYKE)

- Comparative study on rhetorics of biodiversity and its management from selected European sites (areas) in different countries
- The empirical work and analyses have been carried out and the paper is in the weiting phase

Actors:

Riku Varjopuro (lead), UNIBUC, ALTERRA, CONECOFOR, ILE-SAS

Timing:

- Intensive writing period Summer 2008,
- Manuscript finalized by October

Deliverable:

1. Varjopuro et al.: Nature Conservation in Local Newspapers, manuscript in progress

C. SUPPORTING ACTIVITIES

Activities will include:

C.1 Tele-meeting of the IDR activity leaders every 2-3 months lead by Eeva Furman.

C.2 Run a mid-term evaluation seminar of the progress in the IDR-plan. An all IDR-parties workshop will take place in Edinburgh CEH, October 20-24, 2008.

C.3 Build the annex of IDR to the Memorandum of Understanding of ALTER-Net II.

Assessment (March 2009):

Contribution to interdisciplinarity within ALTER-Net:

- C.1 and C.2 enhanced collaboration between the activity leaders but especially C.2 also of the researchers from different activities; defining and other challenges of interdisciplinarity were discussed at the workshop and all work was presented across activities. One venue of this kind is not, however, enough to go in depth into issues; surprisingly much interest was seen for planning of projects that could be carried out in the LTSERs
- The C.3 process was not that active but all WP leaders and researchers in many of the interdisciplinary work packages had an opportunity to provide their comments to the drafts. Altogether 3 drafts were revised for the use of the Council

Deliverables:

1. the Annex 7 of the ALTER-Net II MoE, Interdisciplinary research

Annex 2: The Annex for interdisciplinary research in the Memorandum of Understanding of ALTER-Net II

ALTER-Net Council

ALTER-Net Annex 7
Interdisciplinary Research
Revised – 4th April 2008

1. Summary:

Interdisciplinary research will be promoted by establishing and maintaining a network of LTSER-areas, by common working mechanisms and by interdisciplinary training programmes.

1. Technical description

Interdisciplinary research combines natural, human and social sciences when studying biodiversity related issues. Often stakehoders are part of the research process.

ALTER-Net brings together researchers from different countries and disciplinary specialisations and has jointly developed and tested methodological approaches that are applicable across Europe. It will continue to support inter-disciplinary research on the ecosystem approach and the sustainable use of biodiversity. Approaches include research on attitudes and values, on knowledge production and collaborative management and on models of socio-ecological linkages. ALTER-Net's strengths in these areas include:

- the use of a European network of LTSER-platforms from which regularly updated relevant and standardized socio-economic data are made available to the research community for interdisciplinary research;
- common approaches to facilitate interdisciplinary research across Europe including a common framework for analyses and modelling based on, for example, the DPSIR framework;
- common methods for improving our understanding of public attitudes towards biodiversity;
- training programmes for young scientists in interdisciplinary research related to biodiversity using prominent teachers from the involved research institutes.

3. Benefits to partners and their evaluation

The demand for interdisciplinary research is increasing in search for answers to policy relevant questions on biodiversity. Questions on impacts of non-biodiversity focused policies on biodiversity, on costs and benefits of a given measures, on different options for meeting the demands of the Habitat Directive or the consequences for biodiversity of climate change and mitigation measures can only be answered in a meaningful way by using interdisciplinary approaches.

The LTSERs, the common approaches and the training programmes will make it possible for partners to increase their competences in interdisciplinary biodiversity research and improve their competitiveness on a European scale.

Criteria for success:

- Number of LTSER-areas and platforms;
- Number of projects using LTSER-area data;
- Number of refereed publications using LTSER-area data;
- Further development of common modelling framework based on DPSIR;

- Number of studies that combine natural science and social science research on biodiversity issues;
- Number of scientists who have participated in ALTER-Net training courses;
- The use of inter-disciplinary research processes in policy development.

4. Obligations of Partners

Partners recognise the importance of interdisciplinary research on biodiversity and will provide resources to allow participation in meetings, training, proposal writing and paper publication.

5. Agreed Partner Commitments

- The lead of IDR activities will circulate among partners on a two year basis. Partner SYKE will take the responsibility of overlooking the transformation of ALTER-Net project phase activities towards activities described in this annex.
- NERI will take the lead to further develop the ALTER-Net modelling framework
- UBA, NERI, NINA, UNIBUC, IEB-HAS and Alterra will establish, maintain and support LTSER platforms, see also Annex 5.
- The following ALTER-Net partners will work together to standardize socio-economic data related to biodiversity: NERI, CEH, CEMAGREF, NINA etc.)
- Other commitments regarding interdisciplinary research are also included in Annex 3 (training) and Annex 5 (LTER Europe).

6. Additional Co-ordination and Management Requirements

Additional resources will be needed for secretariat support of the IDR activities.

Annex 3: Guidelines for the facilitation of interdisciplinary dialogue

- Tested and revised based on two workshops "Interlinkages between bioenergy and biodiversity" Edinburgh October 2008, Helsinki March 2008

Taru Peltola (SYKE) & Saija Miina (University of Joensuu)

Note: Designed based on testing and development at the March 2008 Helsinki and October 2008 Edinburgh workshops, this guide is meant for use with approximately 30 people taking part in a one and half day workshop. The number of working groups and ideas selected for further processing will of course depend on the number of workshop participants; based on participant feedback from the 2008 Helsinki and Edinburgh workshops, it is highly recommended that the duration of the workshop be extended to two full days.

The workshop was facilitated by Saija Miina, a professional facilitator, with previous experience in the interdisciplinary dialogue method. She was assisted by several group facilitators coached on these guidelines in advance of the workshop and who then carried out the facilitation in their own groups. The group facilitators were also briefed on the phases of the workshop prior to the start of the workshop.

DAY 1

1. Pre-workshop exercise

The workshop includes a pre-workshop exercise emailed to the participants approximately two weeks before the start of the workshop; the instructions and background materials for the exercise are also made available for download (e.g., during the workshops we held, the materials were posted on the SYKE website, www.environment/syke/bioenergycase).

A pre-workshop exercise is organised to make participants think about topics and to produce a tentative list of research ideas which they could bring with them to the workshop. The compilation of research ideas can be done either by reading the provided background material (e.g., in the case of ALTER-Net workshops, summary charts of reviewed literature and information about potential calls for bioenergy-related projects) or based on personal experience.

2. Introductory round

After a short introduction of the purpose of the workshop, the participants introduce themselves to each other.

3. Introduction to the themes

After introductions, presentations making an overview or giving critical perspectives can be given. In Alter-Net workshops two presentations were given: one about the ongoing work within Alter-Net, related to the topic of the workshop (given by Berien Elbersen, see chapter 7 on the Alter-net position paper summary) and the other, to bring attention to various aspects related to the topic (given by Taru Peltola). During the presentations, the participants are asked to write down research ideas, to complement their pre-workshop exercise lists that they received during the introductory presentations.

4. Introduction to the group work

Time: 30 minutes

The group work starts with a presentation of the basic rules of ideation and the working method. After this, working groups for the brainstorming session should be formed (5–6 persons per group). This can be done either in advance if the background of each participant has been made known to create random or mixed groups. Each group should have a trained group facilitator who can facilitate the teamwork effectively by making certain that every member's opinions are heard and valued. Some rules to ensure this are given below.

Basic rules of ideation:

- no critique
- no breaks
- produce as many ideas as possible
- sequence ideas by listing and numbering them

5. Brainstorming session

Time: 60 minutes

The explicit aim of brainstorming is to produce as many new ideas linked to the topic as possible. Each working group is asked to produce at least 100 ideas in a sitting. A great number of ideas is insisted on, on purpose; the pressure to produce as many ideas as possible in a short time helps people to orient towards a non- critical way of working. Pre-workshop exercises can be utilised for this purpose. The ideas should be listed as a few key words on flipchart paper taped to the wall. The role of the group facilitator here would be to stimulate the ideation.

Instructions for group facilitators:

The working group should sit in a circle around the working table. They should have plenty of flipchart paper (A1 size), markers (not red) and tape. The task of the group facilitator would be to record on flipchart paper every idea presented with a couple of key words. The ideas should be numbered so that the group can keep track of the progress of their brainstorming and know when the mark of 100 ideas is reached. Flipchart paper should be hung on the wall or against windows so that the ideas are visible to all.

In addition, group facilitators should pay attention to two things:

1. No criticism should be allowed in this phase and even seemingly absurd or wild ideas should be welcome. In the case where there's debate about whether an idea should be listed, the facilitators should interrupt, write down the idea and encourage new ideas. Remember, the best ideas often come from misunderstanding!
2. No long breaks should be allowed during the flow of discussion. If ideas seem to fall short, the facilitator should step in to stimulate thinking with questions like: Who do you think has made progress in the field? How could his/her work be continued? What is the most urgent problem in the field? From what perspective has the topic been studied before? What could a new angle be to problematic topics? If you combine two of the ideas presented, will a new idea be created? Can you reverse some of the ideas? What would happen if you took some of the ideas and formed a question out of them, beginning with how? If you looked at the issue from the viewpoint of city people/landowners/children, what would you discover?

6. Preliminary selection and processing of ideas

Time: 10 minutes
The brainstorming session is followed by a selection phase. First, everyone chooses and records in writing three most interesting ideas or a combination of ideas from the list produced by the working group. Only one of the ideas chosen can be one's own. Work in this phase has to be done in silence.

Time: 1 hour
The selected ideas are then shared with the group, with the group facilitators recording them on a new sheet of flipchart paper. After a round of sharing of favourite ideas, the group chooses 3–5 ideas or a combination of ideas to be processed further (by discussion or vote). The ideas are then described and listed in point form, one idea per sheet of flipchart paper.

Instructions for the group facilitators: Write down the selected ideas on a new flipchart paper.

7. Inter-group sharing of ideas

Time: 10-15 minutes per table
Participants visit other tables to present their own group ideas and to learn other group ideas. New groups are formed at this stage, with members breaking out of their original groups to join new teams of people. Details to existing ideas are added to flipchart sheets by the newly formed group. Long discussions are not encouraged at this stage as the main purpose of this stage is to form an overview of what has been going on in other groups.

8. Sorting out of ideas

Time: 15 minutes
In the next phase the participants choose the ideas they would like to continue working with. Each participant assigns a plus sign (using red markers or stickers) to what he/she regards as the four most interesting ideas. Only one of these ideas can come from the participant's original group.

9. Grouping of ideas

Time: 30 minutes
After the first day, group facilitators group similar, overlapping or connected ideas. Each group of ideas should form a logical combination for the basis of a research project. Each group of ideas is given a title, and four to six of the most popular or recurring groups of ideas are selected for further conceptualisation during the second day of the workshop.

DAY 2

10. Presentation of the research project ideas and grouping

Time: 30 minutes
Day 2 starts with general instructions for the day's work. The selected research project ideas and the criteria for their selection are presented briefly, and participants choose a research project idea to elaborate. Connecting participants and research ideas can be done in a number of different ways: for instance, at the Edinburgh workshop, a race was held, where the three quickest participants to reach the flipchart sheet with their favourite research idea could form a group together. The rest of the participants were assigned groups to join to ensure a mixture of scientific backgrounds. In the end of the workshop participants were allowed to join other groups for the post-workshop processing of research plans.

11. Further development of ideas

Time: 1 hour
The groups start working on their ideas by combining, rejecting or adding to ideas listed under their topics. The groups are instructed to aim for a specific end product: a framework for a research proposal and a plan for post-workshop work. Group facilitators act as scribes at this stage, taking down notes on a laptop and guiding the process by providing items and questions to be discussed.

Instructions for group facilitators: The group should gather around a table in the meeting room to work. Facilitators provide a guide for the research plan, a Word file containing an outline of items for the research plan (see below). The group builds on this outline as much as they can during time allotted. It is important that the group decides how the work with the plan or proposal will proceed after the workshop, who will be take charge of contacting the rest of the group, and what the work schedule will be like. Once the outlining of the research plan is finished, the plan should be saved on the computer used for presentations.

Planning guide:

- Working title
- Research question / objectives
- Methods
- Expected results
- Collaboration
- Users and beneficiaries
- What are some possible funding sources?
- How will the proposal writing continue?
- Who will be in charge of coordinating the proposal writing?

12. Research plan presentations

Time: 3–5 minutes per research plan + 10 minutes for signing up, for a total of 30 minutes
In the final session, research plans are presented to the entire workshop group. Each group nominates someone other than the facilitator to present the group's ideas, including plans on how to continue the planning work. Outlines of the research plans (Word files) are shown by data projector. Following the presentations, participants are free to sign up to join other groups.

All research plans and participant contact details are copied and distributed to the entire workshop group.

13. Workshop evaluation

Time: 15-30 minutes
Participant feedback should be collected to get a sense of what went well in the workshop and what needs improvement. The feedback should be collected in writing, with each participant being given a formal evaluation form to complete.

Annex 4: A map of bioenergy/biodiversity-related expertise

Janne Rinne

a. Bioenergy from agriculture: energy crops and short-rotation woody crops (SRWC)

MECHANISMS RELATED TO BIODIVERSITY				
Prime research needs				
Drivers Forces behind changes	**Pressures** Changing conditions for ecosystem survival	**Status of biodiversity**	**Impacts** Impacts on humans from changes in the status of biodiversity	**Responses** Debates, policy formulation, decisions, policy instruments, implementation
Increasing need for renewable energy sources due to diminishing oil reserves and rising oil prices. (CBD 2007) Increasing demand for bioenergy due to the UN climate treaty and Kyoto Protocol. (CBD 2007) Increasing demand for bioenergy following EU targets on renewable energy. (European Commission 2003, 2007) Aims towards greater energy self-sufficiency and security. (Coelho 2005; European Commission 2006, 2008) Bioenergy production contributing to GDP and supporting national economy (CBD 2007) Regional policy development based on bioenergy production, promoting rural employment and energy security (Coelho 2005; Worldwatch Institute 2006; CBD 2007; Yemshanov & McKenney 2008). CO^2 trading (European Parliament & European Council 2003) Higher land prices as a result of competition for arable land and leading to increased pressures on protected areas. (GEF-STAP 2006) Environmental degradation observed in many countries that is promoted by land use policy that authorises the clearing of forests for energy plantations	(-) Increasing demand for energy plantations causing agricultural expansion; this may lead to deforestation and occupation of wetlands and riparian areas. Peatlands may be drained and converted to energy plantations (GEF-STAP 2006; CBD 2007) (-) Extensive energy crop monocultures reducing habitat diversity in agricultural landscapes (homogenization of the landscape). (GEF-STAP 2006; EEA 2006; CBD 2007) (-) Conversion of valuable habitats to energy fields. (WWF 2006) (-) Unsuitable farming practices e.g., ploughing causing soil erosion and CO^2 release from organic soil (EEA 2006; CBD 2007) (-) Unsuitable farming practices e.g., use of heavy machinery causing soil compaction (EEA 2006) (-) Unsuitable farming practices e.g., excessive biocide use causing soil and water pollution. (EEA 2006) (-) Unsuitable farming practices e.g., increased fertilizer use causing eutrophication of water ecosystems (-) Excessive irrigation causing salinisation, droughts and damage to aquatic ecosystems; many	(-) Agricultural expansion causing habitat loss, fragmentation and change (deforestation; changes in land use, vegetation cover and crop species) as well as loss of species, changes in species composition and ecosystem functions. (EEA 2006) (-) Changes in functional groups (e.g., decomposers, pollinators, predators) causing further changes in species composition and material cycles. (-) Cross-pollination occurring between genetically modified energy crops and their wild relatives. (CBD 2007) (-) Hybridisation of introduced energy plants with local species and subspecies (e.g., Salix). (-) Energy crops becoming invasive (CBD 2007; Low & Booth 2007) (+) Shift from monoculture to multi-species farming resulting in increased crop, landscape and habitat diversity (Roth et al 2005) (+) Maintenance of threatened species that are dependent on cultural habitats through maintenance of those habitats, e.g.,, mowing of meadows (+) Perennial rhizomatous energy plantations increasing invertebrate diversity (Semere & Slater 2007)	(-) Deterioration of ecosystem services: homogenization of landscape may result in a loss of pollinators and weakened natural pest control; changes in vegetation cover alter water flow regime (- / +) Maintenance/ change of cultural landscapes and aesthetic values (Skärbäck & Becht 2005) (+) Maintenance of ecosystem services (e.g., pollinators) in multi-cropping systems Impacts not directly related to state of biodiversity: (-) Water security problems due to droughts and water pollution due to excessive irrigation and biocide use (WWF 2006) (-) Decreased productivity of agricultural land due to nutrient export and loss of organic soil (-) Land ownership conflicts, indigenous peoples' rights and food security problems in developing countries. (Colchester et al 2006; CBD 2007) (+) Bioenergy use having many indirect environmental benefits IF fossil fuels are replaced with bioenergy (EEA 2006) (+) Recovery of fisheries due to rehabilitation of aquatic ecosystems	Political reactions and debates Policy recommendations for biofuels (Groom et al. 2008) Policy formulation and instruments: feed-in tariffs, tax exemption and reduction, biofuel quotas and import regulations (WWF 2006) Scientific reactions: development of 'second generation' biofuels from ligno-cellulosic crops (GEF-STAP 2006) Scientific reactions: research of short-rotation woody crops (SRWC) (Dickman 2006) Scientific reactions: development of environmentally friendly farming practices and crop mixes (EEA 2006). Scientific reactions: projects defining sustainable bioenergy potential for agriculture (EEA 2007) Scientific reactions: life-cycle analysis (LCA) of bioenergy (GEF-STAP 2006) Economic reactions

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b. Bioenergy from forestry: energy wood, logging residue and stumps

MECHANISMS RELATED TO BIODIVERSITY				
Prime research needs				
Drivers Forces behind changes	**Pressures** Changing conditions for ecosystem survival	**Status of biodiversity**	**Impacts** Impacts on humans from changes in the status of biodiversity	**Responses** Debates, policy formulation, decisions, policy instruments, implementation
Increasing need for renewable energy sources due to diminishing oil reserves and rising oil prices. (CBD 2007) Increasing demand for bioenergy due to UN climate treaty and Kyoto Protocol. (CBD 2007) Increasing demand for bioenergy following EU targets on renewable energy. (European Commission 2003, 2007) Aims towards greater energy self-sufficiency and security. (Coelho 2005; European Commission 2006, 2008) Bioenergy production contributing to GDP and supporting national economy (CBD 2007) Regional policy development based on bioenergy production, promoting rural employment and energy security (Coelho 2005; Worldwatch Institute 2006; CBD 2007; Yemshanov & McKenney 2008). CO^2 trading (European Parliament & European Council 2003)	(-) Changing environmental conditions in ground layer: more extreme conditions in humidity and temperature, decreased amount of biomass, change in N-C ratio and lower pH. (EEA 2006; Metla & Tapio 2008) (-) Decreasing amount of deadwood (EEA 2006; Metla & Tapio 2008) (-) Loss of soil fertility due to export of nutrients with residue (EEA 2006; Berglund & Åström 2007; Metla & Tapio 2008) (-) Overharvesting of firewood puts additional pressure on forest ecosystems (CBD 2007) (-) Possible large-scale changes in carbon and nutrient cycles (Haberl et al. 2005) (-) Energy wood collection requiring heavy machinery transport to collection sites, and leading to soil disturbance (compaction, erosion) and damage to trees (EEA 2006; Berglund & Åström 2007; Metla & Tapio 2008) (-) Stump removal causing soil erosion (EEA 2006) (-) Export of nutrients (cations) leading to lower soil pH and ultimately to metal (Al, Fe, Mn, Cd) solubility and leaching into water systems (Metla & Tapio 2008) (-) Changes in water (and nutrient) flow regimes (EEA 2006) (-) Logging residues protect the soil from the rain, sun and wind. Residue extraction may cause soil erosion. (EEA 2006)	(-) Habitat loss and fragmentation of deadwood-dependent saproxylic species due to excessive deadwood extraction; among critical groups are decomposing fungi, beetles, flies (Diptera) and parasitic wasps (Ichneumonidae). (Jonsell 2007; Metla & Tapio 2008) (-) Establishment of the trap effect': logging residue attracts saproxylic species, a significant proportion of whose local populations can be removed along with the residue (Metla & Tapio 2008) (-) Soil disturbance affecting mosses, particularly vegetatively reproducing species (Metla & Tapio 2008) (-) Habitat change in ground layer (change in humidity, pH, amount of biomass, nutrients) leading to changes in plant community. (Mahendrappa et al. 2006, Metla & Tapio 2008) (-) Changes in biomass amount and C-N ratio affecting decomposition (Metla & Tapio 2008) (-) The likelihood of species (i.e., birds, small mammals) dependent on heterogeneous environments in clear-felled areas being negatively affected by loss of sheltered microhabitats and nesting sites (Berglund & Åström 2007)	(- / +) Some insect pests (e.g., Hylobius abietis) attracted by logging residue and stumps can be deterred from forest environments by residue removal; conversely, wood storage piles can have the opposite effect of attracting pests (Metla & Tapio 2008) (- / +) Many fungal pathogens of trees are dependent on stumps and deadwood (e.g., root pathogen Heterobasidion annosum). Impacts similar to those described for insect pests (above) (Metla & Tapio 2008) (- / +) The removal of cutting residue may change the composition of insect pests and their predators (Gedminas 2007) Impacts not directly related to the state of biodiversity: (-) Export of nutrients slowing down tree growth in the long term, which can adversely affect the forest industry (Metla & Tapio 2008) (-) Effects on forestry: stump removal leading to an increased number of saplings and increased share of deciduous trees, in turn leading to more laborious thinning of the forest (Metla & Tapio 2008) (- / +) Collection of residue and stumps having positive as well as negative effects on the recreational uses of the forest (Metla & Tapio 2008) (+) Bioenergy use having many indirect environmental benefits IF fossil fuels are replaced with bioenergy (EEA 2006) (+) Synergies with the forestry: Combined thinning of forest and energywood collection. (EEA 2006; Metla & Tapio 2008)	Political reactions and debates Policy recommendations for biofuels (Groom et al. 2008) Policy formulation and instruments: feed-in tariffs, tax exemption and reduction, biofuel quotas and import regulations (WWF 2006) Policy formulation and instruments: instructions for collecting energy wood are included in forest management instructions (Koistinen & Äijälä 2006) Decision-support programs for analysing forest residue recovery options (Röser et al. 2006) Scientific reactions: development of second generation biofuels from ligno-sellulosic crops (GEF-STAP 2006) Scientific reactions: development of environmentally friendly collecting practices Scientific reactions: projects defining sustainable bioenergy potential for forestry (EEA 2206) Scientific reactions: life-cycle analysis (LCA) of bioenergy (GEF-STAP 2006) Bioenergy market studies (Berg 2003). Public reactions Economic reactions

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Bioenergy from biowaste

c. Bioenergy from biowaste

MECHANISMS RELATED TO BIODIVERSITY				
Prime research needs				
Drivers Forces behind changes	**Pressures** Changing conditions for ecosystem survival	**Status of biodiversity**	**Impacts** Impacts on humans from changes in the status of biodiversity	**Responses** Debates, policy formulation, decisions, policy instruments, implementation
Increasing need for renewable energy sources due to diminishing oil reserves and rising oil prices. (CBD 2007) Increasing demand for bioenergy due to UN climate treaty and Kyoto Protocol. (CBD 2007) Increasing demand for bioenergy following EU targets on renewable energy. (European Commission 2003, 2007) Aims towards greater energy self-sufficiency and security. (Coelho 2005; European Commission 2006, 2008) Bioenergy production contributing to GDP and supporting national economy (CBD 2007) Regional policy development based on bioenergy production, promoting rural employment and energy security (Coelho 2005; Worldwatch Institute 2006; CBD 2007; Yemshanov & McKenney 2008). CO^2 trading (European Parliament & European Council 2003) Biowaste as a source of energy (e.g., agricultural residue, manure, municipal solid waste, black liquor from the pulp industry, waste wood of many origins, sewage sludge and food processing waste). (EEA 2006) Rising quantities and overall levels of waste (EEA 2006) Increasing economic value over time of energy derived from biowaste (EEA 2006) EU policy for waste management (EEA 2006)	(-) Recycling generally more environmentally beneficial than incineration; energy recovery from waste currently being reused or recycled may increase environmental pressure (EEA 2006) (+) Smaller environmental pressures in other waste treatment practices (e.g., landfills, dumps, etc.). (EEA 2006)	(+) No major direct effects on biodiversity from waste use in energy production; indirect effects are mainly positive (EEA 2006)	Impacts not directly related to status of biodiversity: (+) Use of waste for energy production mitigates climate change	Policy formulation and instruments: The use of biowaste for energy supply should not counteract the aims for waste reduction, recycling or reuse (EEA 2006) Political reactions and debates Scientific reactions Economic reactions Public reactions

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Annex 5: Feedback on the methodology used in the BE/BD pilot

Taru Peltola

A. Workshop feedback

ALTER-Net Interlinkages between Bioenergy and Biodiversity Workshop
Helsinki, 11 March 2008

After the Helsinki workshop, participants were asked to reflect on the workshop method. Participants were provided with the following questions to think about their experiences:

- Do you think the method was useful in facilitating interdisciplinary discussion?
- How can the method be improved or developed further?
- In what ways can the results of the workshop be used in SYKE/Alter-Net?
- How can the ideas be taken forward (e.g., how can the 'life cycle' of the ideas be tracked?
- Do you have other comments?

Comment 1
The method was useful facilitating the interdisciplinary discussion – as different points of view are taking into account.
-> there is a possibility to discuss and/or to explain other options
-> within Alter-Net it should also be worth considering as many scientist participate on the project and use different methods and have different opinions how to solve the problem.

Results should be used within Alter-Net (e.g. reports) to inform other working groups about the dealing issues (ideas are often overlapping).
Comments -> to get more clear context of the chosen topic should be worth considering.

Comment 2

1. The method was useful and I liked when it had different phases so that you also allow the first – chaotic – phase but have a way to get forward from it.
2. To some extent it might be good to define the LEVEL we are working on - especially if you AIM for a certain CALL or USER.
3. In SYKE we could use the method when we need to collaborate with people from various units / or why not with our collaborators, as well. And in the ALTER-Net bioenergy workshop yes.
4. I hope the outcome will be well documented and used in the A-Net study but also given to the energy-team (project) of SYKE.
5. Thanks Taru! and Janne!

Heikki was very pleased of the method but wanted the ideas so that he can use them in the May SBSSTA meeting.

Comment 3
Elaborating of the most interesting ideas towards a "project proposal" is good, but:

- - What will happen to the other ideas, which were brought up in the 1st "brainstorming" phase? Will they be further refined? And if so, how, where and when?

- - It is good that there was minimal amount of guidance for the group discussions. This enabled "free" flow of ideas and different approaches / angles, which was clearly visible in the outcome.
- - More experts from different fields will produce wider perspectives.

Comment 4

- - The method seemed to work. The discussion started but we ran out of time.
- - Maybe more concrete instructions for the presentation would be useful.
- - The groups should have a "leader" who would organize the group work
- - The charts could have been circulated earlier. Now they were not read (at least not before the workshop)

Comment 5

- from your group work

1. Your method was useful: our group quite successfully incorporated economical, ecological and social/political aspects into clearly defined topic, dead wood budget and policy guidance in producing forest energy
2.
3. To me it appears that we could quite easily proceed into producing a discussion paper on our topic with the present participants.
4. See above (otherwise these meetings appear pointless…)
5. The aim/point of the workshop was not at all clear to me in the first place – I was not familiar to the project of PTO/ALTER-Net similarly as the personnel of PTO and only towards the end of the meeting I got some kind of idea of the aims. Now it seems that the point was to develop the "method" while I thought that I was entering a biodiversity/bioenergy workshop. Correct me if I got it wrong. In any case I enjoyed the discussion and got interesting new ideas to develop my thinking (and to clarify some old ideas).

Comment 6

1. The purpose of the exercise should be made clearer- What we are seeking for: a research project, increasing our understanding without any objectives or what! Would we have a clearer objective, the method could be useful.
2. All the phases should be explained more carefully and the context explained: e.g. should we see itself as a European researcher, as a citizen or as a politician. I prefer the first choice , but this would be made clear so the we have right perspective.
3. Now the result are not easy to use, because ideas are not necessary related to real-world working processes. Would we have…common project

Comment 7

1. Partly. After the first division of groups, a wide variety of different fields were represented in the groups. When the latter division was done, this ended; the other group had only ecologists, other one more soc/politically oriented people! So, I think people should be kept mixed all the way.
2. The work in groups should be directed more clearly to be productive; i.e., a chairperson is needed. Otherwise the discussion may wander away into irrelevant topics, and not produce any clear results.
3. If you make similar groups elsewhere, it would be interesting to see if similar subjects showed up. These are likely to be the most relevant ones. – but also the oldest ideas.

Comment 8

- Workshop method feels useful, it was possible to go through discussions so that people from different disciplines could understand each other. This is a good way to formulate questions.
- To take the ideas forward, each participant should write concrete proposals on the basis of the discussion. Those should be developed further in small groups, with background information collected beforehand.
- Thus, I would suggest a series of workshops to be able to prepare a good research plan or working paper.
- The work could be more effective, if the participants would make the brainstorming phase beforehand, each one alone, and the results would be available for all in the first meeting where the main topic would be to go through the proposals quickly and then to proceed to formulating the topics for joint work.

B. Workshop feedback

ALTER-Net Interlinkages between Bioenergy and Biodiversity Workshop
Edinburgh, 20-21 October 2008

The Edinburgh workshop participants were asked to provide their feedback based on the following questions:

- Do you think the method is useful in facilitating interdisciplinary discussion?
- How could the method be developed?
- In what ways the results could be used in Alter-Net/in your own work?
- Other comments?

Comment 1

Method is very useful! I liked it as it immediately helped to focus people on the final goals, which is development of multi-disciplinary project proposal. It prevents the long unfocused discussions in which people put their own visions/ ideas forward.

Comment 2

1. The background work did not help; rather had negative impacts
2. Think more carefully how to take the ownership of phases to follow
3. We came to concrete plan in my team
4. The night in between was important

Comment 3

Interdisciplinary:
Helps to have outsider moderate or write topics – neutrality
Overall method + process were productive

Comment 4

1. Method useful? Yes.
   What enhanced?
2. Method developed? facilitator quality is most important (was ok here)
3. Results in own work used?
4. Other comments?

Comment 5

- Method is useful. In NL common. In interdisciplinary
- also valuable with stakeholder discussions

Comments:

- using post-it yellows/? can even improve the
- what do we do with the lost ideas of Monday? I think there are valuable ones.

Comment 6

Reflections

Yes is useful. Go ahead in involving stakeholders in your workshops.

I will start in my work case studies. We have money ourselves to cofinance (Province of Geldenland).

Alterra will work together with us and stakeholders and setting up a method of monitoring.

Comment 7

In my opinion, this method was really very good. Participants were provoked (in good meaning) to think about the problems, discuss about the problems and try to formulate their thoughts. Especially, motto of group work "Every idea is good", "Every opinion is good" really helped to brainstorming.

Comment 8

I think there is some information loss often the 1st phase (writing up 100 ideas > 3-4 "good" ideas (which are actually quite similar!)). Some good ideas are lost here. Interdisciplinarity stimulates you to think in another way and to account for certain aspects you wouldn't have dealt with elsewhere.

Comment 9

The method is useful.

- enhanced cross-thinking and exchange of experience and ? points

The method could be improved by classifying the +/- 300 ideas in different categories like: 1) main ideas to be developed and combined (like we did) 2) startling and inspiring new (mostly isolated) ideas 3) ideas addressing others; 2 and 3 could also be paid attention to. There is still potential in new ideas put up, I think.

I will use the information for Probos and hope to be involved in the further development of 2 proposals.

Thank you for inviting us.

Comment 10

The overall method seems productive, but could be improved in different ways, maybe.

- the brainstorm was a bit too much ? and too little focus on problems (which need to be elaborated more)
- 2. ? was most productive in ? of ?
- experimentation (?) is necessary across disciplines

Comment 11

Thanks a lot to the organizers!

I think the method is truly useful, and it facilitates the discussion, also has concrete (practical) outputs. It's important now to develop further the ideas into tenders to come jointly for FP7 (other?) funds. Now the long-distance collaboration means

a lot. Through time/efforts the Alterneters ? having an informal "authorship" of the ideas (sure by involving others…) but gradually… Thanks again!

Comment 12

Reflections from the work group
I think this was fruitful – the 1st day progressed well; the schedule was ok.
However, more time would have been needed in the 2nd day – punctually, in the writing of the "proposal". Actually, a whole day would have been needed here as well. The lack of the half day resulted in "proposals" which are not as expressive as they could be on the basis of the brainstorming.
I myself am used to a somewhat slower way of working (maybe, sometimes, to a more analytical, too) but I was happy to learn a lot from these days.

Comment 13

1. The method is good since it allowed some persons to attend discussions in a group where they would not have gone at first choice (i.e. choice where they have an "obvious" knowledge and expertise to share).
2. Building/having common issues: the different disciplines expressing what are for them, in their disciplines, the main challenges/opportunities/ pressures, and together, co-build (?) common issues and questions to address. Since the beginning, not after the question is being formulated. This is true disciplinarity.

Annex 6 Evaluation of integration in ALTER-Net

Riku Varjopuro and Marja-Leena Kosola

1 Introduction

To trace the development of and to identify the important issues that have defined integration in ALTER-Net, an evaluation was carried out. Three dimensions of integration, namely integration of disciplines, integration of partners and integration of work packages were considered in the evaluation. Integration between the sciences was an overarching theme of the evaluation, and in addition to direct integration, the evaluation looked at coordination practices from the point of view of integration.

The evaluation was conducted in two phases: first after the first 18 months of ALTER-Net's existence and now at its conclusion. This report points out the main findings, especially the lessons learned, for future collaborations. The evaluation was focussed on integration in research activities and thus does not cover the entire scope of ALTER-Net activities.

1.1 Background

Integration between disciplines is very relevant in the context of ALTER-Net. Interdisciplinarity refers here to both disciplinary collaboration between the different natural sciences as well as the broader collaboration between the natural and social sciences. Both types of integration were aimed at in ALTER-Net. Transdisciplinarity, i.e., collaboration between scientists and other types of actors, was not covered in the evaluation.

ALTER-Net was a consortium of 24 partners from 18 European countries with a wide coverage both geographically (North-South, East-West) and politically (old and new EU countries). This posed some challenges for equal collaboration, especially when many of the partners had not worked together very closely before participating in a common biodiversity research network.

ALTER-Net is organised into various work packages (WPs), some of which support integration along different axes while others are more research-oriented. While the evaluation concentrated mainly on integration between disciplines, many of the research WPs were focused on certain yet broad, disciplinary approaches. Co-operation among WPs was crucial in practice for integration to occur between the sciences. The evaluation covered those WPs with an expected similarity in working methods, based on broad scale collaboration to conduct or support research.

The evaluation also looked at coordination practices and how they support integration into ALTER-Net. By coordination the overall coordination of ALTER-Net as well as the coordination of individual workpackages are meant.

1.2 Material

The material for this report was collected in two stages. Altogether 15 interviews with WP leaders and one 'ordinary' member each from WP I2, I3, R2, R3, R4, R5 and R6 were conducted during the summer and autumn of 2005. In the second phase, in 2008, 8 interviews were conducted. The information was mainly collected through telephone interviews that were recorded and subsequently transcribed.

2 Main findings

This section proceeds from a description of the activities performed in and between WPs to broader topics of multi-disciplinarity and network coordination. Results are presented here as a narrative, leaning towards concluding remarks rather than a comprehensive presentation of the insights and observation collected. Thus, a main aim is to point out the lessons learned for the future collaborations.

2.1 Work in the WPs

WPs started their work based on the Description of Work (DoW) that was prepared in the proposal phase. This created an unavoidable 'top-down' start for the activities in ALTER-Net. The DoW did outline the main work themes for the WPs, providing objectives and even defining outputs to be produced within the first period. However, the top-down start had somewhat alienating effects as the topics and activities defined did not always meet the interests and expertise of the participants. A further difficulty was that many of the WP participants had not known each other before and getting to know each others' interests and expertise took time. In this regard, the WPs were given a certain amount of flexibility to rephrase WP goals and outputs to find a better fit with the interests and expertise of the participants.

The first main task for the WPs was thus to (re)define for themselves what they were actually going to do. This was not just a question of the content of the work, but rather a process of getting organised. A combination of various elements had to be considered: the given, but not categorically binding DoW; different styles of leadership; heterogeneous groups of people expected to work together; and a lack of funding for actual research. It was noted in an interview that ALTER-Net participants had different reasons for attending the meetings and taking part in the collaborations. Reasons varied from clear ideas of scientific collaboration via a more general interest in networking to simply taking part as a representative of a partner institute. One also should note that as the collaboration began to form, the network itself began to actualize with more concrete and even new topics emerging. Networking is a dynamic and multi-entry process that provides various reasons for collaboration that are not all fixed from the beginning.

Finding the focus (or focuses) for the work was a real challenge in the beginning as was witnessed by most of the interviewees. In fact, one could argue that finding a focus was the key to integration in all of the dimensions: integration of partners, WPs and disciplines. It was emphasized in the interviews that the most natural way for the researchers to operate is to focus on certain topics – which is what they normally do. Topics give purpose and direction to their collaboration. Without a commonly identified purpose, collaboration or integration would not be meaningful for individual researchers. By participating in ALTER-Net many of the researchers were directed more towards getting engaged in research strategy formulation than in actual research. This created a persistent tension that is, in fact, hardly avoidable in any large scientific networks or organisations.

The WPs (at least those covered by the interviews, see above) did (re)define their tasks and even some of the DoW objectives as they started to find a research focus. This did have some consequences. A natural and positive outcome was that the WPs could now start working productively. Another outcome was changes in participants. When the WPs were able to organise their work around certain topics it became much clearer what kind of expertise was needed and, from perspective of participants, the publishing and/or networking opportunities a WP could give them became clearer as well. All interviewees had witnessed an emergence of core groups of approximately 10 persons in different WPs. Some people left WPs after the focus became clearer and,

naturally, changes of personnel in participating institutes resulted in some people leaving and new persons getting involved in ALTER-Net WPs.

Clearer definition of the focus of each WP helped in finding concrete interfaces with other WPs, because as the work around the defined topics progressed the knowledge gaps became more visible. In other words, WPs could see the kinds of information they needed, but could not provide themselves with the expertise to match. In some cases, this mismatch of needs and expertise forced looking outside ALTER-Net for collaboration with researchers to address the information or expertise gaps.

While the DoW defined objectives, no clear recommendations or rules existed on how to organise the work of different WPs. In effect, the WPs had organic ways of coordinating their work, combining the various heterogeneous elements.

From the interviews one may observe two extremes of organising scientific collaboration in ALTER-Net. The following diagram describes these extremes and a possible combination of these extremes that could actually work as a model for future collaborations.

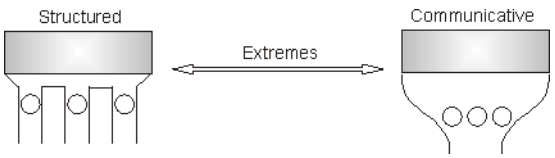

Figure 1. Ways of organising scientific collaboration. The two extremes were identified from the interviews. Grey boxes are the overall task (assigned) for the WPs. The lines below the boxes describe ways of organising the work. The circles are the actual tasks or focuses of the work.

The two extremes are the 'structured' and 'communicative' ways of organising scientific collaboration. The structured way on the left divides the overall objectives (grey box) quite rapidly into smaller tasks (circles). In ALTER-Net many of the WPs assigned task forces to conduct certain, clearly defined tasks. One WP in particular resembled closely the 'structured' extreme, as its way of conducting the work was to assign task forces very early in the process without much interaction between the tasks. The communicative way was also practised in ALTER-Net. A WP that could be described as operating under the communicative extreme was one that explicitly aimed its activities at continuous discussions and debates about theoretical and methodological issues without dividing itself into smaller units. It also conducted specific tasks, but kept open communication all the way. Other WPs were also closer to the communicative way of organising their work. Narrowing of the focus as depicted in the figure was in many cases, in fact, also a shift of focus.

Both of the extremes take advantage of the possibilities that scientific networks like ALTER-Net provide. The structured extreme utilizes available expertise among the participants to conduct research assignments in an efficient way, while the communicative extreme seizes the opportunity to have qualified discussions and debates on theoretical and methodological issues. Seen from a perspective of an individual participant, the structured way provides opportunities to produce results and publish together, while the communicative way has a more pedagogical approach, supporting dialogue between disciplines. In ALTER-Net both types of work organisation did result in producing publications and educating participants, which are definitely not mutually exclusive, but more a question of different emphases given.

The WP structure in ALTER-Net was important in the channelling of most of the funds and thus also the structuring of the activities. However, the WP structure was not the only guiding principle for the activities and the borders between WPs did not always have such a separating or exclusive effect. First of all, there were many participants who worked in several WPs and for them the WP structure revealed itself

very differently than to those who worked only in one of the WPs. For the latter type of participants, the WP structure was perhaps the guiding principle for participation in ALTER-Net. However, the interviews also revealed that for some, the WP structure was simply non-existent. One of the interviewees, a person who had been very active in collaborating with many individuals in ALTER-Net and had contributed to several publications without being committed to any of the WPs, found it difficult to specifically identify under which WPs the publications were produced. This sort of 'opportunistic' way of participating in large networks is an interesting example of the kinds of scientific collaborations that become possible. Naturally, such an approach cannot be the guiding principle for building a network that also requires more or less stable structures, but is nevertheless something that could be further acknowledged and encouraged. The mobility fund that supported such ad hoc collaboration (among other purposes) was a very important means to support collaboration outside official structures.

Lessons learned on work in WPs

Two points should be raised for consideration in organising scientific collaborations, either in the continuing ALTER-Net collaboration or in other contexts. One is a more systematic approach for organising the collaboration (i.e., a more systematic way of coming to a research/project focus), the other is an approach to make the borders between WPs less rigid.

The initial problems in defining what the WPs are actually about and how the partners should collaborate with one another points to a need for a more methodological or systematic approach for finding ways of working together and especially finding content for that work. Organising WP collaboration as shown in Fig. 1 gives but two possible extremes, and experiences gained from working within ALTER-Net does not give a basis for selecting one of extremes as 'the best' way of organising scientific collaboration. As mentioned above, both approaches have their strengths and weaknesses, but could both approaches' strengths be combined to bring about greater success in organising scientific collaboration?

A combined way of organising scientific collaboration would involve the use of elements from the two extremes. On the one hand, it would encourage defining specific tasks to enhance production of research ('structured'); on the other hand, it would aim to frequently organise open discussions on the tasks being conducted to increase communication and synergies between the tasks ('communicative'). The latter would also have the pedagogical effect of enhancing interchange between the disciplines. The revision of tasks and discussions on possible synergies can result in re organisation of tasks with changes to the content and even number of tasks. ALTER-Net experiences have shown a few practical examples of such reorganisation: some of the ALTER-Net WPs discovered their possible linkages to other WPs after they had been able to define their own focuses and progressed in work. However, in spite of the discovered need of input from other WPs, linkages could not really be made as the WPs progressed in different directions with regard to their workpackages; this was not expected and definitely called for more 'methodological' approaches to enhance integration. This approach of planning scientific collaboration could be called 'methodological reflection'.

However, the suggested review of the work in progress is not the only 'methodological' phase of re-organising scientific collaboration. As the start of ALTER-Net WPs was difficult and slow, there would have been a need for more methodological ways of finding the focus(es). Naturally, all WPs did have discussions and planning meetings in the beginning, but the interviews did not reveal any clear or planned methods for finding the focuses.

The explicit method used for defining research questions and preparing projects that was used in the ALTER-Net BE/BD process is a good example of how finding a shared focus can be organised. That process started from a predefined but rather general goal of exploring the relationships between biodiversity and bioenergy and respected the heterogeneity of the participants of the process, by establishing a bottom-up procedure that proceeded from identifying topics iteratively to planning actual research projects. This is an example of a process that starts work by reflecting on the methodological issues related to organising scientific collaboration.

Scientific collaboration in big networks like ALTER-Net requires structures to enhance planning, implementation and funding operations. In the case of Alter-Net the structure both supported and limited collaboration. Especially one supporting feature should be highlighted here. It was the possibility for individuals to find relevant (from their individual points of view) collaborators to work even by not assigning to any particular WP. These sorts of possibilities should be further nurtured as they turn out very productive collaborations. ALTER-Net was able to fund such collaborations through its mobility fund.

2.2 Collaboration of WPs

ALTER-Net was structured in different WPs. Some of them were more method-oriented while others had objectives of combining and producing knowledge. Collaboration between the WPs was expected and supported. The two sets of interviews do show that progress was made – the first set of interviews indicates that the forms of collaboration between WPs was still being sought, while the second set indicates clear examples of successes and failures.

There were for instance two LTER-focused WPs that found an easy interface and collaborated intensively. Less frequent collaborations occurred between multiple WPs. Again a key to collaboration in many cases seems to be the finding of a focus for within a particular WP that allows the finding of effective linkages to other WPs. It also happened that in spite of the identified need for information/expertise, collaboration did not work as the partner WP was not ready to provide what was needed at that stage.

Over the years some unexpected linkages have also been established as WPs have found out their needs and what other WPs can provide. However, in some cases the redefined focus made expected collaboration impossible. For instance, modelling-focussed WPs developed in different directions, which no longer provided a workable linkage.

A good means of enhancing collaboration between WPs were joint meetings. There were attempts in the beginning of ALTER-Net to promote collaboration by organising large joint meetings for several WPs; however in the end, the most efficient according to interviewees were meetings between two or three WPs that had a clearly focussed purpose for the meeting. Another means were visits from other WP representatives during individual WP meetings. The fact that there were several persons who took part in the activities of various WPs supported collaboration. Finally, the Network Management Board that consisted mainly of WP co-ordinators was mentioned by all interviewed WP leaders as a valuable forum for ensuring exchange of information between the WPs and even directly of enhancing collaboration between the WPs.

The interviews also showed that some WPs developed to become rather independent due to their definition of the task. It was mentioned that ALTER-Net management proposals for broader WP integration was experienced by many WPs as more distracting than supporting. It was also pointed out that joint planning and strategic thinking in the beginning would be the way towards enhancing collaboration, as finding links after the work has begun may be more contingent.

Lessons learned on collaboration of WPs

There were some elements in ALTER-Net that influenced collaboration between WPs, seeming generalisable outside the context of ALTER-Net.

First, joint clearly focussed meetings enhanced collaboration between WPs. The large meetings were not mentioned as events that would create contacts or interchanges leading to immediate collaboration. It is clear that large networking events, such as annual conferences and joint meetings of five or six WPs, naturally have other goals and the possible networking effects may only materialise in the longer term.

Second, the Network Management Board was found as a very useful forum in enhancing collaboration. The exchange of information about work content in various parts of ALTER-Net was needed or the network management issues (e.g., budget) were useful, but in the interviews the management group was also mentioned as a peer group in which persons in similar positions in the network could share their feelings and experiences as WP leaders.

Finally, the issue of imposed integration was mentioned in several interviews. The overall goal of integration was accepted as such, but found difficult or even distracting from the perspective of WPs and their immediate tasks. Integration as a general and abstract goal does not seem to resonate with researchers' collaborations very readily. Collaboration emerges most naturally through concrete research topics.

2.3 Disciplinary integration

Enhancing interdisciplinary collaboration was one of the goals of ALTER-Net. The network supported multidisciplinary communication in various ways, such as organising summer schools that addressed the issue of interdisciplinarity.

Interdisciplinary collaboration took place within and between WPs. Again interviews point to the importance of topics as an intermediate force of attraction between disciplines. As interdisciplinarity as such is abstract and not tangible, interviewees emphasised that it should not be a goal in itself.

The WPs had different approaches to interdisciplinarity. Fig. 1 describes the two extremes of how the WPs operated and these pertain also to the style of approaching interdisciplinarity. The structured approach is an example of a multidisciplinary approach, in which the same (broad) problem is approached from the perspectives of different disciplines. Each discipline works rather independently, coming together to provide a multidisciplinary view of the topic. The structured approach can result in rather dispersed understanding of the studied topic, as disciplines provide their own findings. The communicative extreme could work as a platform for interdisciplinary collaboration. In that approach different disciplines work closely together in frequent communication. The exchange between disciplines can lead to the merging of concepts and models and thus towards true interdisciplinary collaboration. The communicative approach, more difficult and uncertain, can provide if successful, a more coherent and integrated view of the topic.

Several of the WPs covered in the evaluation had practised integration between disciplines. It was either a topic for debate and discussion purposely and explicitly, or a problem encountered as heterogeneous groups of researchers worked together. The interviews also showed that there were WPs in which integration between sciences was not a topic at all and never discussed, although the co-ordinator observed that the WPs as a whole combined different disciplinary approaches. These were organised in a rather structured way, showing that a multidisciplinary way of organising disciplinary collaboration does not necessarily result in interchange between the disciplines.

What was noticed in the interviews was a difficulty in meeting criteria for 'good science' in research that combines different disciplinary approaches. The same

has been observed by other scholars of interdisciplinarity (e.g. Corley et al. 2006). Researchers participating in collaboration have their own disciplinary criteria for good science, and co-publishing articles based on interdisciplinary research may be very difficult for this same reason. In practice, as was also witnessed in ALTER-Net, the consequence is that interdisciplinary research activities are often built around one disciplinary approach while other disciplines have a supportive or complementary role. It may be a good practical way of organising integration, but this on the other hand leads to a situation where the incentives to individual participants are not equal.

An open and transparent way of building the projects can also substantially improve the interdisciplinary quality of research projects. If there is a need to build an interdisciplinary project in the first place (keeping in mind that it should not be a goal in itself), a process that allows participants with different disciplinary backgrounds to co-define the research questions and objectives has a potential of resulting in a project that offers reasonable incentives for all participants to reach results as well as serve as a platform for mutual learning. How the building of joint projects is organised is of utmost importance. A lesson from the analyses of participatory environmental policy processes can be analogically used for processes involved in the building of interdisciplinary projects. Those analyses have shown that how the process is organised influences "what is said, what can be said, and what can be said with influence" (Hajer 2005).

Lessons learned on disciplinary integration

Interdisciplinarity was an explicit goal of ALTER-Net and was met in many of the WPs. ALTER-Net experiences show a rather wide variability in practising interdisciplinarity as can be expected, since any clear advice or instructions on how to organise collaboration in WPs were not given. Two points should be raised at this juncture.

First, the 'communicative' way of organising collaboration provides a good platform for exchange between the disciplines and taps into the pedagogical aspects of interdisciplinarity. Therefore, how collaboration is organised is important.

Two, here again the imposed integration (also in terms of disciplines) does not seem to be very effective: it is rather the topics that bring disciplines together. However, the topics themselves, even though powerful, do not alone solve the problem of how collaboration is organised.

2.4 ALTER-Net co-ordination

One topic that emerged again and again in the interviews was the co-ordination of ALTER-Net. The interviewed WP leaders were asked about their observation of how co-ordination has worked and how it could be improved. The unanimous conclusion by WP leaders was that the coordinators had done excellent work and provided support to them when needed. Also the Network Management Group that consisted mainly of WP co-ordinators was mentioned as being very useful. The management group was thought to be a forum to enhance interaction between the WPs, but also one that worked as a peer group for WP co-ordinators who were facing more or less similar challenges in their tasks.

Overarching goals were established in ALTER-Net especially to enhance integration between WPs. The tension between the original top-down goals of integration and actual work conducted in WPs by groups of individual researchers was evident and the overarching goals were thus created as a linking mechanism between the overall co-ordination and the WPs. However, the overarching goals remained rather an abstract construct to many of the WP co-ordinators. Overarching goals were seen by some as an artificial, top-down forcing of integration that did not find much resonance

in the actual collaborations of researchers. Here again the importance of topics as the intermediating means to support 'natural' collaboration between researchers was emphasised. One could conclude that top-down efforts to enhance integration should focus more on identifying topics with the potential of intermediating between the disciplines than stating overarching or cross-cutting themes.

'Unallocated funds' was mentioned as an issue in both sets of interviews, thus persisting all through the duration of the network. WPs had a certain amount of money available to them that was not allocated in annual plans, but as needs emerged. The issue was exactly how this money would be eventually allocated. This is a minor detail in the operation of a huge network like ALTER-Net, but it nevertheless pertains to two big issues, namely flexibility and transparency. A large network needs to have a certain amount of flexibility to respond to needs that emerge along the way. Some of the WP co-ordinators mentioned that the unallocated funds were a very useful instrument as it allowed them to quickly respond to such needs. However, it was also observed that WPs handled the matter very differently. Some were very transparent and open in how the money was allocated, while in other WPs, it was not transparent. Transparency in a large network like ALTER-Net is of utmost importance to support the building of trust and a sense of community. Transparency and flexibility are not mutually exclusive although they do limit each other as ALTER-Net experiences show. A rapid response to a need can be seen as a flexible way of operating, but being transparent would not affect the rapidity to respond or slow down activities critically. If anything at all, being transparent supports more qualified decision-making, as all influenced participants have a possibility to express their views.

Lessons learned on network coordination

In a sense lessons learned from all the preceding sections apply to or have implications on network management. However, the last point raised about the need to consider the interplay between flexibility (as a capacity to react rapidly on emerging needs) and transparency should be emphasised again. Transparency and openness can help build trust and commitment in the collaboration, which in the longer term will improve the quality of collaborations even though practising transparency may not be the most flexible way of managing scientific collaborations.

3 Final remarks

As has been already emphasised, scientific collaborations work most naturally through the establishment of concrete enough topics. Finding a research focus came decisive in the operations of the WPs, but also in establishing links to other WPs and between disciplines. Topics are the means that bring researchers together and allow them to contribute their expertise. Also the incentive structures in science are such that will give more weight to productive collaboration that result in dissertations and publications than to collaboration for its own sake. This was crystallized in one interview in the following way: "If everyone is thinking just politics, no one does research". "Politics" refers here to a top-down request for integration.

Through that quote one can also localise the source of tension between general top-down goals and individual re-searchers' reasons to participate in such networks. There are justifiable general goals to enhance integration (in various dimensions), but seen from an individual's perspective, the goals remain abstract if recognisable at all. ALTER-Net experiences show that a large network, with these top-down and bottom-up processes, does produce integration in various ways, even though it did not always took place the way it was planned. Furthermore, collaboration and integration have emerged also unexpectedly outside the official structures of ALTER-Net. So in this respect, and in spite of occasional frustrations, integration was achieved. One

could even conclude that the tension between the top level and individual scientific collaborations at the grassroots level is a somewhat natural phenomenon in any large organisation. But an alternative way of supporting integration would be to build around more topic-focussed and bottom-up approaches as depicted in the concept of 'methodological reflection'. Criteria for this reflection could include critical assessment of integration needs and outcomes.

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Corley, E.A., P.C. Boardman and B. Bozeman 2006. Design and the management of multi-institutional research collaborations: Theoretical implications from two case studies. Research policy, 35: 975-993.

Hajer, M. 2005. Setting the Stage. A Dramaturgy of Policy Deliberation. Administration & Society, 36: 624-647.

Annex 7. BE/BD pilot workshop results from the Edinburgh workshop

1. Zonation of area – where to establish e.g. short-term stands
2. Layers of land use (geological, biological) infrastructure
3. Where is the best place to experiment with biomass? (natural conditions, logistics,…)
4. Where are main BD values relative to bioenergy potential?
5. Incentives for biomass
6. Other functions for the biomass /value
7. Ecosystem/social functions
8. Climate change adaptation e.g. eat resistant towns (planting trees)
9. How are BD values related to biomass production – are these coupled?
10. Landscape management: can we add biomass and to improve landscape quality?
11. Landscape restoration – can we bring new elements to landscape?
12. New species? Ecologically suitable species
13. Silvicultural methods e.g. selection cutting
14. Risks associated with alien species or cultivars
15. Plantations multiclonal
16. How to combine biodiversity with biomass?
17. Is the plantation an ecosystem?
18. Different models for fulfilling the EU policy goals
19. How to ensure high quality landscapes?
20. BD values of non-logged and non-conservation areas?
21. How to add biomass and ensure landscape quality?
22. Monitoring of BD in biomass plantations
23. Is there a biodiversity problem? How big it is?
24. How much pressure can be put for biodiversity? > carrying capacity > ability to recover
25. Short rotation in forestry
26. Second generations bioenergy
27. New technologies
28. Which kind of landscape elements give most biomass (e.g. trees, willow) and suit to the landscape?
29. How to increase public interest to bioenergy?
30. Energy efficiency & cost
31. Different practices for bioenergy production
32. Communication of best practices
33. Comparisons with other kind of energy production systems
34. Life-cycle analysis
35. Costs and energy
36. Communication between farmers, landowners, government
37. How communicate the research results?
38. Demonstration sites
39. Communities of practice > where are the problems? (e.g. farmers problems)
40. Markets (volatile)
41. Transportation costs
42. Researchers as parts of communities of practice
43. Recommendations put in practice > checking the reality (how did their work)
44. Large scale landscape effects > demonstration projects
45. Legislation: legal restrictions to the use of biomass
46. Sectoral government: different sectors addressing BD issues / bioenergy
47. What kind of organisations are responsible for the various issues?
48. Interests of research institutions? (e.g. forest research)
49. Cultural differences between institutions, organisations, regions
50. Cultural differences between farmers and nature conservation
51. Co-operation between companies processing biomass
52. Co-operatives of farmers & other land owners
53. Optimum amount of partners / area/ amount of biomass
54. Facts & figures about the processes
55. Economic background; quality of biomass
56. Cost-benefit analysis for the society
57. Planting strategy SLOSS
58. Monocultures / multi-species mixtures (low input systems)
59. Permaculture
60. Decentralization
61. Supply cooperatives (local)
62. Low-input – high output systems
63. Tree leaves to be used
64. Strategy for compost restructured
65. Co-degestation

66. Methods of valuing biodiversity to support decisions
67. How to value: abundance /rarity?
68. Tilting point in adding bd value with cultivation
69. Scale of biodiversity: how to value levels, scales?
70. Good & bad biofuels
71. Introduction biomass into existing agrisystems (also produce biomass)
72. Biomass crops / biol. invasions
73. Biomass crops / weed communities
74. Indicators for sust. biomass production
75. Use of residuals +biomass prod.
76. Import of biomass & impact on ecology in developing countries
77. Global feedback mechanisms
78. Aliens
79. Genetic conservation + biomass crops
80. Market value of bd
81. bd value of abandoned farmlands
82. Opportunities to increase value
83. Stable functions
84. Algae + eutroph.
85. Renewables (others the bioenergy) alternatives and bd
86. Energy balances of biomass schemes
87. Representative studies that can be interpreted on European scale
88. 2nd generation biofuels
89. Urban green areas as source of boenergy
90. Indirect land use change > bioenergy impacts
91. Use of invasive species as biomass
92. Use of weds as source
93. Impact of transportation on invasive species dispersal (contamination)
94. Green waste
95. Aesthetics and bioenergy crops / animals
96. Social impact of harvesting
97. Impact of transportation biomass
98. Climate mitigation <-> biodiversity (is impacts same direction or not)
99. Scale of harvesting
100. Temporal complexity and energy succession
101. The use of devastated areas for bioenergy /mass prod.
102. Hydrological constraints + impacts
103. Nitrogen balance
104. < Versus carbon balance
105. Co-products
106. Use of hedgerows / grass (landscape elements)
107. < Sustainability of use
108. Suppressing succession for biomass
109. BIOCHAR (back to land)
110. Planning of bioenergy landscapes
111. NO2 > incremental nitrogen
112. > Natural succession speed
113. Bioenergy cultiv. Impacts on soil
114. Bioenergy harvesting impacts on soil
115. Biodiversity/ complexity
116. Children – bioenergy – biodiversity
117. Value of artificial to natural diversity
118. Historical cropping re-analysed / introduced
119. Genetic diversity of crops / plantations
120. Genetic provenance
121. Genetic modification
122. Cache cropping (different cropping)
123. Different harvesting systems
124. New equipment in agriculture
125. Minimal energy use – energy efficiency to higher
126. Cookbook for sst biomass
127. Joined up thinking policies – research – society on same level of thinking
128. Adaptability of research programme
129. Research outputs to practice
130. Availability – research outcomes
131. Database
132. Tactical / strategic research
133. Uncertainty & confidence
134. National, supra-national policies and global perspective /dimension

135. Market development > harvesting pressure
136. Carbon trading scheme + BD
137. Climate mitigation <-> state of BD
138. Effectiveness of policy on bioenergy /BD
139. C.C. adaptation > planting among trees > BD/BE viability
140. Conservation of ecosystems / climate change
141. Ecosystem services and biomass issues
142. Harvesting season / timing > impacts of BE/BD
143. Storage of biomass stocks
144. Harvesting BE from biomass storages
145. Comparison of BE systems
146. LCA
147. Impacts of short rotation forestry (20-30 yrs) on BD
148. Biomass – first material, then energy
149. Recycling of by-products (espec. Agricult. nutrient concervat & sustainability)
150. Minimization of land use for BM prod. /SRF (floating, short-rot. forests & aqua /agroforestry systems)
151. First food then energy
152. Multiple use of BD; more extended use)
153. Which are governing factors for BD? (most important; criteria)
154. Public perception of BD (how this should be conveyed to public?)
155. Streams of materials (waste, sewage sludge, etc. > for bioenergy etc.)
156. Design of new landscape with high BD value
157. New possibilities (plant etc.) for BE production
158. Use of landscape elements for BE production
159. Drawbacks / challenges of different farming systems for BE; effects on BD
160. BE & balances regional development
161. Producers of BD – get paid for production of it
162. Recycling of nutrients in soil
163. Cradle to cradle
164. Combination of public-private entities for BE production
165. Certification of BD in all areas of BE prod.
166. Level of BD necessary in ecological system
167. Negative effects of BD on BE
168. Turning forest from timber production to BE prod. / conversion strategy
169. N2000 – possible to use for BE
170. Evaluation of effects / rel. to 23
171. Define landscapes – for certain habitats; energy landscape as a habitat
172. Non-woody biomass – how to make energy & eep BD
173. Policy debate – energy, env. transport
174. Multi-level assessment /interaction between various levels of policy makers
175. Use of dead animals /-/ for BE prod.
176. How to attract private entrepreneurs to produce BE?
177. Economic instruments for BE prod.
178. BD monitoring in rel. to biomass prod.
179. Balance between big private enterprises /localised production systems
180. Interaction between BD / social issues (many issues not studied yet)
181. Urban forestry
182. Mountains (hw to collect & do it in sustainable way)
183. How to diminish inputs if energy in agriculture / forestry?
184. Transport system /in combination with water
185. Transport costs for biomass production
186. Development of low-cost BE prod. in Europe (imports to 3rd world)
187. Self-sufficiency of Europe (diminishing of imports)
188. Local growth of energy plant (in gardens etc, trees on roof)
189. Energy passive house concept
190. Consuming less energy (large scale)
191. BE+landscape function
192. invasive species
193. coppiced trees for BE at borders (hedges + …)
194. abandoned land + balance multi-function
195. BE + citizens /consumers
196. BE + landscape stability /ecological network
197. potential + barriers for perennials in farming systems
198. public attitudes evaluation for land-use change
199. indicators for sustainable BE
200. farmer perception of BE crops
201. intersectoral participation for multi-function land-use governance
202. influence of BE prod. on water
203. comparative study of bioenergy prod (long term) BD indicators, diff. crops + management approaches

204. local BE + local livelihood
205. technology needs for small-scale harvest
206. link EU renewable policies to local level implementation
207. win-win situation in intensive (or other) cultivation contexts
208. subsidies for micro-scale BE prod + use
209. risk perception of citizen/ consumers re: BE
210. support for BD in context of intensive forestry (also for BE)
211. N+K balance in BE > impacts BD
212. peat lands – sustainable management BD vs. climate change
213. role of consumer practices in BD choices
214. infield /outfield system in local BE coupled with low-intensity and organic farming
215. BE prod + natural risks (erosion etc)
216. use of wastes from nat. reserves for BE; link to farmer work
217. trust in consumption decisions on BE
218. Can BE crops improve landscape heterogeneity?
219. integration of BE prod. in regional / rural sustainable development strategies – agroforestry
220. feasibility of BE options given BD constraints
221. BE on polluted soils /brownfields/ historically polluted riverbeds
222. BE prod. at the farm level + uncertainty (economic + food)
223. knowledge transfer to practice
224. BE + pest management
225. BE + farmer identity
226. sustainability impact assessment of BE options
227. comparative analysis of BE + other sources (nuclear +…)
228. BE and GMOs
229. landscape approach to BE prod (collaborative farmers, regional/industrial symbiosis)
230. spatial / territorial approach to risk and BE, policy drivers / climate change, supply / demand
231. BE prod. in policy integration: climate, habitat, water, energy security,…
232. BE + different policy instruments
233. Equity considerations: justice, fairness, global food scarcity + prices
234. BE + landscape diversity /aesthetics
235. global impact assess, of EU BE policy, displacements + trade offs
236. institutional constraints on BE
237. short rotation forest plantations vs. forest residues: env. + socio-economic criteria
238. BE in everyday context of consumption
239. education on BE
240. localisation of BE crops in a catchment
241. gender dimension – for BD and BE?
242. introgression with natural species
243. optimal BE use: heat, electricity, transport
244. potential for erosion protection
245. comparison of different crops: dry mass production vs. inputs
246. challenges + opportunities of BE prod. across different countries in Europe, regions, climates, existing farming practices
247. BE + multi-functional agriculture
248. overfertilized soil mitigation through BE
249. BE + food safety / food protection
250. global deforestation and BD loss: equity + environmental considerations > socio-economic
251. multi-level governance of bio-energy prod.
252. marine algae, biogas as inputs to farming systems
253. balancing stakeholder interests + conflict resolution in BE
254. criteria for integrated policies on food, energy and environment
255. bridging the gap between science, policy and practice
256. short term considerations and strategic long term objectives, timing + sequence of policy processes
257. BE as on-farm diversification strategy
258. political character of BE: solution to which problems? Cause of which problems?
259. animal + human waste as source of BE; link with water protection + lower input agriculture / soil protection
260. analysing consumer behavior (goods + ecosystem services) + balancing supply / demand issues
261. linking BE goods to demand management, demand reduction
262. BE, BD and ecosystem services, policy + research links

Step 1: Group work session 1: Brainstorming
262 ideas
Step 2: 13 selected and further elaborated research ideas
Best practices & communication
- Communities of practice for sustainable biomass production - Demonstration sites - Managing knowledge - Integration of research into society - Knowledge transfer
Decision support
- Valuation of biodiversity issues - Accessibility of results - Database - Joined up thinking: decision makers / researchers suppliers / society - Uncertainty to dealt with - Tools, models, practical demonstration projects - Monitoring effectiveness - Delivery mechanisms: science <-> policy <-> practice
Integrated multi-level policies and win-win solutions on BD On biodiversity, environment, energy and food:
- Landscape: introducing (mass harvesting) bioenergy crops into (existing) production systems while improving diversity - Regional: integration of bioenergy products in regional sustainable development strategies, link with agro-forestry-cooperatives - Global: impact of increasing bio-energy production on biodiversity, displacement effects, food security - Communication between levels; also feedback needed
Sustainability impact assessment of BE development in multifunctional landscapes (+ ecosystem services) in Europe
- Methodological focus: development of indicators (soil Q, species,…) for the sustainable use of BE, with a focus on biodiversity
Multifunctional analysis of biomass production regimes
- Cost-benefit analysis - Ecosystem functions (services) (flood control, “heat resistant cities”) - Social functions - Historical - Cultural - Biodiversity - > What are the different functions of increased biomass production? - Dust - Best practices
Challenges and opportunities of BE production in multi-functional land-use systems in Europe
- Representative case studies (learning from exceptional as well...) <-> classification of case studies - scenario analysis - weak points, strong points - learning from existing examples = development of criteria
Bioenergy landscapes
- Existing BE landscapes - New - Several small/ single large - Monocultures / mixtures - Efficiency (energy / economic residuals) - Scale: Impacts on local /European level - Social impacts - Logistics - Use of different landscape elements /farming systems/forest systems - Sustainable BE landscapes - Horizontal & vertical multifunctional landscapes

Design of a (framework) new BD friendly bioenergy landscape (cradle-to-cradle)
- Stakeholders/ inhabitants - Waste produced – is resource - How to design it? - Multifunctional / diversification - Aspects of system o Production/ by-products o Transport o BD o Energy conversion - Planning / regional concept (energy, BD and biomass prod.) - Quality criteria (N2000?) as a goal - Use of traditional concepts when possible - Cascade in landscape - Combination of WFD objectives, BD value & bio-en. production - Sustainability assessment framework
Not-economical forest & agricultural lands > energy prod
- to restore and maintain BD value - from non-use to use (Finland, Sweden, Russia) - Mountain areas - Restoration (after cutting) ensuring BD value - Possible use as carbon sinks - Agricultural lands / restore BD values - Use of carbon trade mechanisms for restoration of habitants - Could bioenergy production be sustainable in abandoned areas? - Institutional conditions for utilisation / management of abandoned areas?
Ecol. carrying capacity and resilience of harvested ecosystems (or you are going to harvest)
- Harvesting of biomass - Long-term integrity of ecosystems (references? Do we need it? We need to take in climate change) - How to measure integrity? = biodiversity (definition?) - Indicators / monitoring (methods to measure carrying capacity) - Biodiversity = Bioenergy productivity?? - How far are we from carrying capacity? - What are the points of no return? o Ecosystem o Harvesting - Combination of proper experiments & adaptive management + modelling
Monitoring of trends in biodiversity under different harvesting regimes (forests, agriculture…) including biomass production regimes
- Different systems / types in forestry, agriculture - Intensity of harvest (plantations – logging residues) - Species composition (plants, animals, functional aspects) - Ecosystem functions /fysio. (carbon, nitrogen) - Development (assessment) of methods / guidelines / indicators? - Products: 1) methods + guidelines 2) response curves - How to harvest? - What is the point of origin? - Frequency
Involvement of BDin sustainability criteria
- Certification of bioenergy production - Goal setting – which BD do we want - How to monitor impacts? - Level of BD necessary in ecological system; effects of BD on bio-energy prod. - BD-impacts at ecosystem level - Indicators → BD ↔ ecosystem ↓ Cascade effect

Global consequences

- situation in developing countries
- who owns bioenergy?
- knock on effects + domino effect, feed backs
- direct and indirect landuse change
- permaculture
- gobal biorefinery system
- local impacts
- equitability
- possible policy instruments like CO2 credits

Step 3: 4 topics chosen for project proposals

Topic 1: Integrated multilevel policies on bioenergy, biodiversity, environment and food

Background: The integrated multilevel policy approach to bioenergy is justified by three developments and the problems related to them:
1) There is strengthening competition between various activities in the same space (e.g. agriculture, tourism, and nature conservation). It follows the need for new strategies in optimising the use of biological resources and the locations for the activities.
2) Rural space has traditionally been incorporated into sectoral policies, which in turn has led to policy failure i.e. constant conflicts of policy goals. Integrating bioenergy products into existing policy structures requires developing institutional capacity to go beyond narrow sectoral interests and to cross horizontal boundaries of sector bureaucracy.
3) Bioenergy production leads to the restructuring of networks and coalitions of actors at various spatial levels. As the capacity and role of the nation state is in transition, the challenge becomes how the actors are able to accommodate themselves simultaneously to interdependencies at the local, regional and global levels.
Objectives: The main task is to clarify how to successfully integrate global and European level policies into local and regional activities. Further objectives are to develop ways to make the competing interests fitting to each other and to find optimal local solutions for the different bioenergy production regimes. This implies identifying the challenges and obstacles to integrated multilevel policies.
Contact person: Pekka Jokinen, Finnish Environment Institute (SYKE) pekka.jokinen@joensuu.fi

Topic 2: Integration of sustainable bio-energy pathways in multifunctional landscapes

Although the development of bio-based economy in Europe does seem a promising solution to the growing energy crisis, the situation is much more complicated than that. European Union has already set ambitious biofuel production targets for its member states before the full implications of achieving those targets has been fully researched and analysed. The current situation implies, that there is arising conflict between increasing demand for a land for growing bio-energy crops and pressure on ecosystems and biodiversity. Therefore, it is proposed in this research project to develop designs and prescriptions for sustainable bioenergy production at the landscape level, to set sustainability criteria for bioenergy production and develop tools for integration of bioenergy production in multifunctional landscapes. The end users of project results will be farmers and landowners, bio-energy business owners, banks and finance institutions, technology companies, local governments and communities. Further steps in development of this proposal: Alterra will review the proposal internally and communicate to the group.
Contact person: Vineta Goba, European Centre for Nature Conservation, ECNC, goba@ecnc.org

Topic 3: Good practices and sustainability indicators for bioenergy

The main question is to understand the influence of biomass harvesting on biodiversity; effective descriptions of the understanding then need to be integrated with social and economic measures to produce a comprehensive indicator of sustainability. The indicator has to be sensitive to the dynamics of land use change in both spatial and temporal dimensions and be capable of informing debate about change to alternative land use options in agriculture, forestry, and the use of abandoned land and nature. It is important that the indicators of sustainability especially are employed at a landscape level so that we can improve the perspectives of the environmental carrying capacity on national and EU levels. It is expected that on the basis of the study it is possible to develop indicators to identify the best practices and guidelines towards certification of bioenergy. The potential users of the information include e.g. governmental decision-makers, municipalities, landowners, energy policy communities, energy sector and NGO's.
Contact person: Raimo Heikkilä Finnish Environment Institute (SYKE) raimo.heikkila@ymparisto.fi

Topic 4: Impact of EU bioenergy policies on the biodiversity and ecosystem services outside Europe

European Union and its member states have a demand to import bioenergy from other parts of the globe. This requires intensive, externally driven bioenergy production in many places in the world. This study aims to analyse its local level impacts on one hand (both in the production country as well as in the demand country) and its global level effectiveness on the other hand. In the global effectiveness, the focus is on monetary and energetic issues while the local case studies concentrate on impacts on biodiversity, ecosystem services as well as on other social and economic consequences. The study would base on local case studies and global flux analyses. It would triangulate methods from various disciplines including ecology, geography, informatics, economics and social sciences. The key would be to work closely with local stakeholders but more importantly with local researchers. SYKE takes the plan forward in close collaboration with UFZ, but other interested are welcome.
Contact person: Eeva Furman Finnish Environment Institute (SYKE) eeva.furman@ymparisto.fi

DOCUMENTATION PAGE

<table>
<tr><td>Publisher</td><td colspan="3">Finnish Environment Institute (SYKE)</td><td>Date
May 2009</td></tr>
<tr><td>Author(s)</td><td colspan="4">Eeva Furman, Taru Peltola, Riku Varjopuro (editors)</td></tr>
<tr><td>Title of publication</td><td colspan="4">Interdisciplinary research framework for identifying research needs. Case: bioenergy-biodiversity interlinkages</td></tr>
<tr><td>Publication series and number</td><td colspan="4">The Finnish Environment 17/2009</td></tr>
<tr><td>Theme of publication</td><td colspan="4">Environmental protection</td></tr>
<tr><td>Parts of publication/ other project publications</td><td colspan="4">Mikael Hildén, Eeva Furman, Riku Varjopuro, Ludivine Brégeon 2006. Views on biodiversity research in Europe- Reports of the Finnish Environment Institute 16/2006, 36 p
The publication is also available on the internet: www.ymparisto.fi /julkaisut</td></tr>
<tr><td>Abstract</td><td colspan="4">A loss of biological diversity continues in spite of the existing, and in some respects, rather elaborate and heavy attempts at management and protection. It has been argued that one of the reasons for the lack of success is the unmet and challenging knowledge needs. Meeting the needs requires integration of various sciences and expertise, since attempts to manage biodiversity gives rise also to many emerging, complex and political questions. Integration of the disciplines needs practices that are able to overcome practical, institutional and cultural obstacles. ALTER-Net, a European network for research on biological diversity under the 6th framework programme, has aimed to undertake further interdisciplinary research that will feed into the addressing of societal needs.
This report describes how the integration of research progressed and succeeded during the five year life span of ALTER-Net. Initially the integration between disciplines was given as an overall goal, which did result in determining concrete practices of integration between the sciences, teams and partner organisations. The analysis shows that in spite of complications an interdisciplinary research approach can evolve in large research networks, but this can happen also through unanticipated channels. A large network allows room for several parallel processes of integration.
The report depicts the development of and choices leading to the development of an interdisciplinary research framework for ALTER-Net, the IDR framework. The framework presents a method to enhance interdisciplinary syntheses of emerging policy-relevant issues and to further develop the identification of relevant topics as interdisciplinary research projects. The IDR framework was tested by focusing on the interlinkages between the bioenergy question and biodiversity. The report consists of a synthesis of pressing research needs pertaining to that topic.
The report presents how the IDR framework was constructed using a method that encourages dialogue between the disciplines and different expertise. The method tapped into a cost-effective way to obtain expertise from the European research network and collected a diverse set of research needs and ideas on the topic of bioenergy/ biodiversity. Through the method a collection of hundreds of ideas were analysed and synthesised, distilling into four interdisciplinary research plans.
The method provided to the end-users of the research findings and other stakeholders a channel for participating in planning of the research. Although the resulting IDR framework was designed to deal with European- wide biodiversity issues, it is applicable for the planning of research in other contexts and on other scales. It can be applied, for example, in designing the research strategy for long-term socio-ecological research platforms (LTSER) or planning research in multidisciplinary research organisations.
The framework presented in the report creates possibilities for communication between research and decision-making. By using the framework, relevant topics for discussion are brought up, emerging research needs are reacted to for elaboration into concrete research projects, and finally research findings are conveyed to support decision-making. To achieve this requires organised and open collaboration between research organisations and other stakeholders. The collaboration can be created and enhanced by the tested method presented in this report.</td></tr>
<tr><td>Keywords</td><td colspan="4">research, interdisciplinarity, decision-making, integration, biodiversity</td></tr>
<tr><td>Financier/ commissioner</td><td colspan="4">Finnish Environment Institute</td></tr>
<tr><td></td><td>ISBN
978-952-11-3483-8 (pbk.)</td><td>ISBN
978-952-11-3484-5 (PDF)</td><td>ISSN
1238-7312 (print)</td><td>ISSN
1796-1637 (online)</td></tr>
<tr><td></td><td>No. of pages
95</td><td>Language
English</td><td>Restrictions
Public</td><td>Price (incl. tax 8 %)
15 €</td></tr>
<tr><td>For sale at/ distributor</td><td colspan="4">Edita Publishing Ltd, P.O.Box 780, FI-00043 Edita, Finland
Customer service: tel. +358 20 450 05, fax +358 20 450 2380, Mail orders: asiakaspalvelu.publishing@edita.fi
www.edita.fi/publishing</td></tr>
<tr><td>Financier of publication</td><td colspan="4">Finnish Environment Institute (SYKE)
P.O.Box 140, FI-00251 Helsinki, Finland
Tel. +358 20 610 123, fax +358 20 490 2190, Email: neuvonta.syke@ymparisto.fi, www.environment.fi/syke</td></tr>
<tr><td>Printing place and year</td><td colspan="4">Edita Prima Ltd, Helsinki 2009</td></tr>
</table>

KUVAILULEHTI

<table>
<tr><td>Julkaisija</td><td colspan="3">Suomen ympäristökeskus (SYKE)</td><td>Julkaisuaika
Toukokuu 2009</td></tr>
<tr><td>Tekijä(t)</td><td colspan="4">Eeva Furman, Taru Peltola ja Riku Varjopuro</td></tr>
<tr><td>Julkaisun nimi</td><td colspan="4">Interdisciplinary research framework for identifying research needs. Case: bioenergy-biodiversity interlinkages
(Kohti monialaista toimintamallia nousevien tutkimustarpeiden tunnistamiseksi: teemaesimerkkinä bioenergian ja biodiversiteetin yhtymäkohdat)</td></tr>
<tr><td>Julkaisusarjan nimi ja numero</td><td colspan="4">Suomen ympäristö 17/2009</td></tr>
<tr><td>Julkaisun teema</td><td colspan="4">Ympäristönsuojelu</td></tr>
<tr><td>Julkaisun osat/ muut saman projektin tuottamat julkaisut</td><td colspan="4">Julkaisu on saatavana myös internetissä: www.ymparisto.fi/julkaisut</td></tr>
<tr><td>Tiivistelmä</td><td colspan="4">Luonnon monimuotoisuuden köyhtymistä ei ole kyetty pysäyttämään olemassa olevalla, melko raskaallakin hallinnalla. Yhtenä syynä on nähty yhä uusiin, monimutkaisiin ja yhteiskuntaan tiiviisti nivoutuviin kysymyksiin liittyvät tietotarpeet, joiden ratkaiseminen edellyttää eri tieteiden ja asiantuntijuuksien integrointia tutkimuksessa. Tämänkaltaisessa kommunikaatiossa tarvitaan käytännöllisiä, institutionaalisia ja kulttuurisia esteitä ylittäviä toimintatapoja. EU:n 6. puiteohjelman luonnon monimuotoisuuden tutkimusverkosto ALTER-Net on pyrkinyt edistämään monitieteistä ja yhteiskunnan tarpeisiin paneutuvaa tutkimusta.
Raportti kuvaa tutkimuksen integraation edistymistä ja onnistumista viisivuotisen projektin aikana. Lähtötilanteessa tieteiden välisyys ilmeni yleisenä tavoitteena, mutta vuosien mittaan kehittyi verkostossa myös konkreettisia toimintatapoja, jotka mahdollistivat tieteiden, tiimien ja organisaatioiden integroitumista. Analyysi osoittaa, että vaikeuksista huolimatta monitieteisen tutkimusotteen kehittyminen on mahdollista näinkin suurissa verkostoissa, mutta se saattaa ilmetä eri muodossa kuin alun perin oli odotettu. Laaja verkosto mahdollistaa useiden integraatioprosessien kehittymisen rinnakkain.
Raportti paneutuu monitieteisen toimintamallin rakentamiseen ja testaamiseen osana ALTER-Net hanketta. Sen avulla voidaan laatia monitieteisiä synteesejä nousevista, päätöksenteolle keskeisistä kysymyksistä ja tunnistaa keskeisimpiä niihin liittyviä tutkimustarpeita. Hankkeessa toimintamalli testattiin analysoimalla bioenergian ja luonnon monimuotoisuuden yhtymäkohtia. Raportti sisältää synteesin tämän teema-alueen tärkeimmistä tutkimustarpeista.
Raportti esittelee toimintamallin kehittämisessä käytetyn menetelmän, jolla tuetaan monitieteistä dialogia. Menetelmän avulla hyödynnettiin kustannustehokkaasti Euroopan laajuisen tutkimusverkoston asiantuntijuutta ja koottiin laaja ja monipuolinen, satoja bioenergia/biodiversiteetti – teemaan liittyviä tutkimustarpeita ja ideoita sisältävä ideapankki ja tiivistettiin tämän materiaalin perusteella neljä monitieteistä tutkimussuunnitelmaa.
Menetelmä mahdollistaa tiedon hyödyntäjätahojen ja muiden viiteryhmien osallistumisen tutkimuksen suunnitteluun. Vaikka toimintamalli on suunniteltu käsittelemään Euroopan laajuisia ja luonnon monimuotoisuuteen liittyviä kysymyksiä, soveltuu se monenlaisen ja monentasoisen tutkimuksen suunnitteluun. Sitä voidaan esimerkiksi soveltaa pitkän aikavälin sosio-ekologisten tutkimuskeskittymien (LTSER) tutkimusstrategioiden laadintaan tai hyödyntää monitieteisissä organisaatioissa tehtävän tutkimuksen suunnittelussa.
Raportissa esitelty toimintamalli luo edellytyksiä tutkimuksen ja päätöksenteon väliselle kommunikaatiolle. Toimintamallin myötä nostetaan tärkeitä aiheita keskusteluun, reagoidaan tutkimustarpeisiin ja muodostetaan niistä konkreettisia tutkimushankkeita sekä viestitään tutkimustuloksista päätöksentekoa varten. Nämä edellyttävät huolellista ja avointa yhteistyötä keskeisten tutkimus- ja toimijaorganisaatioiden välillä. Tätä yhteistyötä voidaan tehostaa ja rakentaa testattujen menetelmien avulla.</td></tr>
<tr><td>Asiasanat</td><td colspan="4">tutkimustarpeet, monitieteisyys, päätöksenteko, integraatio, luonnon monimuotoisuus,</td></tr>
<tr><td>Rahoittaja/ toimeksiantaja</td><td colspan="4">Suomen ympäristökeskus</td></tr>
<tr><td></td><td>ISBN
978-952-11-3483-8 (nid.)</td><td>ISBN
978-952-11-3484-5 (PDF)</td><td>ISSN
1238-7312 (pain.)</td><td>ISSN
1796-1637 (verkkoj.)</td></tr>
<tr><td></td><td>Sivuja
95</td><td>Kieli
Englanti</td><td>Luottamuksellisuus
julkinen</td><td>Hinta (sis.alv 8 %)
15 €</td></tr>
<tr><td>Julkaisun myynti/ jakaja</td><td colspan="4">Edita Publishing Oy, PL 780, 00043 EDITA
Asiakaspalvelu: puh. 020 450 05, faksi 020 450 2380
Sähköposti: asiakaspalvelu.publishing@edita.fi
www.edita.fi/publishing</td></tr>
<tr><td>Julkaisun kustantaja</td><td colspan="4">Suomen ympäristökeskus (SYKE)
PL 140, 00251 HELSINKI
Puh. 020 610 123
Sähköposti: neuvonta.syke@ymparisto.fi, www.ymparisto.fi/syke</td></tr>
<tr><td>Painopaikka ja -aika</td><td colspan="4">Edita Prima Oy, Helsinki 2009</td></tr>
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PRESENTATIONSBLAD

Utgivare	Finlands miljöcentral (SYKE)			*Datum* Maj 2009
Författare	Eeva Furman, Taru Peltola och Riku Varjopuro			
Publikationens titel	**Interdisciplinary research framework for identifying research needs. Case: bioenergy-biodiversity** (Mot en branchövergripande handlingsmodell för att indentifiera uppkommande forskningsbehov: beröringspunkterna mellan bioenergi och biodiversitet som temaexempel)			
Publikationsserie och nummer	Miljön i Finland 17/2009			
Publikationens tema	Miljövård			
Publikationens delar/ andra publikationer inom samma projekt	Mikael Hildén, Eeva Furman, Riku Varjopuro, Ludivine Brégeon 2006. Views on biodiversity research in Europe- Reports of the Finnish Environment Institute 16/2006, 36 p. Publikationen finns tillgänglig också på Internet www.ymparisto.fi/julkaisut (på finska).			
Sammandrag	Utarmningen av biodiversiteten har inte kunnat stoppas med den befintliga, rätt tungrodda administrationen. En orsak är kunskapsbehoven i frågor som är nya, komplicerade och tätt anknutna till samhället. För att lösa dem krävs i forskningen en integrering av olika vetenskapsområden och expertis. I dylik kommunikation behövs praktiska och institutionella handlingsmodeller, som överskrider kulturella hinder. EU:s sjätte ramprograms forskningsnätverk för biodiversitet, ALTER-Net, har strävat till att främja forskning som är tvärvetenskaplig och sätter sig in i samhällets behov. Rapporten beskriver hur integreringen av forskningen framskrider och hur den lyckas under projektets fem år. I utgångsläget framkom förhållandet mellan vetenskaperna som ett gemensamt mål, men under årens lopp utvecklades i nätverket också konkreta handlingsmodeller, som gjorde en integrering av vetenskaperna, teamen och organisationerna möjlig. Analysen visar, att trots svårigheterna kan ett tvärvetenskapligt grepp utvecklas också i så stora nätverk som detta, men det kan framstå i en annan form än man ursprungligen hade väntat sig. Ett vidsträckt nätverk möjliggör, att flera integrationsprocesser utvecklas sida vid sida. Rapporten sätter sig in i hur en tvärvetenskaplig handlingsmodell byggs upp och testas som en del av ALTER-Net-projektet. Med hjälp av modellen kan man utarbeta tvärvetenskapliga synteser av uppkommande, för beslutsfattandet centrala frågor och identifiera de därtill anknutna väsentligaste forskningsbehoven. I projektet testades handlingsmodellen genom att analysera beröringspunkter mellan bioenergi och biodiversitet. Rapporten innehåller en syntes av de viktigaste forskningsbehoven inom detta tema. Rapporten presenterar den metod, som använts vid utvecklingen av handlingsmodellen och med vilken man kan stöda en tvärvetenskaplig dialog. Med hjälp av metoden utnyttjades expertisen kostnadseffektivt i forskningsnätverket, som omfattar hela Europa. Därtill samlades en vidsträckt och mångsidig idébank, som innehåller hundratals forskningsbehov och idéer som ansluter sig till bioenergi/biodiversitet – temat och fyra tvärvetenskapliga forskningsplaner sammanfattades utgående från detta material. Metoden gjorde det möjligt för dem som drar nytta av informationen och andra referensgrupper, att delta i planeringen av forskningen. Fastän handlingsmodellen är planerad att behandla frågor, som omfattar hela Europa och biodiversiteten, lämpar den sig också för planering av forskning av flera slag och nivåer. Den kan till exempel tillämpas till att utarbeta forskningsstrategierna i nätverket för långvarig socioekologisk forskning (LTSER) eller utnyttjas i planeringen av forskning i tvärvetenskapliga organisationer. Den i rapporten presenterade handlingsmodellen erbjuder förutsättningar för kommunikationen mellan forskning och beslutsfattande. Handlingsmodellen har som följd, att viktiga teman lyfts upp till diskussion, att man reagerar på forskningsbehov och att det bildas konkreta forskningsprojekt av dem samt att informationen om resultaten når beslutsfattandet. Dessa förutsätter ett noggrant och öppet samarbete mellan centrala forsknings- och aktörorganisationer. Detta samarbete kan effektiveras och byggas med hjälp av de testade metoderna.			
Nyckelord	forskning, multidisciplin, beslutsfattande, integration, biodiversitet			
Finansiär/ uppdragsgivare	Finlands miljöcentral			
	ISBN 978-952-11-3483-8 (hft.)	ISBN 978-952-11-3484-5 (PDF)	ISSN 1238-7312 (print)	ISSN 1796-1637 (online)
	Sidantal 95	*Språk* Engelska	*Offentlighet* Offentlig	*Pris (inneh. moms 8 %)* 15 €
Beställningar/ distribution	Edita Publishing Ab, PB 780, 00043 EDITA Kundtjänst: tfn. +358 20 450 05, fax +358 20 450 2380 Epost: asiakaspalvelu.publishing@edita.fi, www.edita.fi/publishing			
Förläggare	Finlands miljöcentral (SYKE) PB 140, 00251 Helsingfors Tfn. +358 20 610 123 Epost: neuvonta.syke@ymparisto.fi, www.miljo.fi/syke			
Tryckeri/tryckningsort och -år	Edita Prima Ab, Helsinki 2009			

Although Europe has been struggling to halt the loss of biodiversity by 2010, it is clear that the target cannot be met. Apart from a strong political and societal will to put the existing policies into practice, new forms of knowledge production and transfer are needed to support decision-making which affects biodiversity across the society and its structures. An identification of the knowledge needs requires tools which bring researchers of various disciplines as well as various stakeholders together to discuss, weigh and funnel ideas into concrete plans for knowledge production and transfer.

This report presents a novel interdisciplinary research framework which facilitates the development of a handful of focused interdisciplinary research plans for the European scale on the basis of hundreds of research ideas by mobilizing researchers of different disciplines as well as stakeholders to innovate and collaborate.

The interdisciplinary framework was piloted by identifying research needs related to interlinkages between bioenergy and biodiversity and the report also presents the concrete policy relevant research needs and their justifications linked to the bioenergy/biodiversity context.

Finally, the report provides a narrative on how the long term biodiversity research network project of the EU (ALTER-Net NoE) evolved towards strong interdisciplinary research collaboration.

SYKE

Edita Publishing Ltd
P.O. Box 780, FI-00043 EDITA, Finland
Customer service: Tel. +358 20 450 05, fax +358 20 450 2380
Mail orders: asiakaspalvelu.publishing@edita.fi
www.edita.fi/publishing

ISBN 978-952-11-3483-8 (pbk.)
ISBN 978-952-11-3484-5 (PDF)
ISSN 1238-7312 (print.)
ISSN 1796-1637 (online)

THE FINNISH ENVIRONMENT 17 | 2009