

Research Programme on Sustainable Use of Natural Resources (SUNARE) 2001-2004 EVALUATION REPORT



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on Sustainable Use
of Natural Resources
(SUNARE) 2001-2004
EVALUATION REPORT

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Julkaisun nimi	Research Programme - Sustainable Use of Natural Resources (SUNARE) 2001-2004, Evaluation Report		
Tiivistelmä	<p>Suomen Akatemian hallitus päätti kokouksessaan 21.3.2000 käynnistää Luonnon kestävä käyttö - tutkimusohjelman (SUNARE). Tavoite oli edistää korkeatasoista tutkimusta alalla ja edistää yhteistyötä eri alojen tutkijoiden välillä, jotta luotaisiin uudenlaisia poikkitieteellisiä metodologisia valmiuksia, joita tarvitaan luonnonvarojen kestävä käyttöön eri ulottuvuuksien samanaikaseen tarkasteluun. SUNARE ohjelma ajoittui vuosille 2001-2004 ja se toteutettiin Suomen Akatemian, Maa- ja metsätalousministeriön ja Tekesin yhteisrahoitteisena ohjelmana.</p> <p>Ohjelman päätyttyä, vuonna 2004, Suomen Akatemia nimitti kansainvälisen asiantuntijapaneelin arvioimaan ohjelmaa. Paneelia pyydettiin arvioimaan ohjelmaa pääasiassa kokonaisuutena erityisesti keskittyen seuraaviin asioihin: tutkimusohjelman valmistelu ja suunnittelu, ohjelman tavoitteiden saavuttaminen, tutkimustulosten merkittävyys ja sovellettavuus sekä suositukset Suomen Akatemialle tulevaisuutta varten. Tämä raportti sisältää arviointipaneelin työn tulokset.</p> <p>Paneeli arvioi SUNARE projektien olevan pääosin tieteellisesti korkealaatuisia, kolmannes projekteista katsottiin poikkeuksellisen hyväksi. Tutkimuksen monitieteisyys ja tieteidenvälisyys toteutui raportin mukaan vain 50% projekteja. Mahdollisena syynä pidettiin sitä, että tätä kriteeriä ei tarvittavassa määrin painotettu projektien valintaprosessissa. Tutkimustiedon siirtyminen tiedon tuottajilta sen käyttäjille vaihteli. Projektien tukiryhmät, joissa oli edustettuina myös loppukäyttäjää, olivat tiedonsiirron kannalta tärkeitä. Myös kansallinen ja kansainvälinen yhteistyö ja verkottumien vaihteli suuresti eri tutkimusryhmien välillä. Paneeli kiinnitti erityisesti huomiota projektin vetäjien usein vähäiseen panokseen opiskelijoiden ohjaajina.</p> <p>Paneelin mukaan SUNARE tutkimusohjelma toimi suhteellisen hyvin. Osalle projekteista SUNARE oli erinomainen foorumi tieteidenvälisyyden kehittämiseen, osalle SUNARE rahoitus varmistti tutkimuksen jatkumisen entiseen malliin.</p> <p>Paneelin keskeisiä suosituksia ovat mm: hakemuksia arvioitaessa tieteellisen laadun lisäksi tulisi ohjelman tavoitteita painottaa enemmän; ohjelman vaikuttavuus tulisi arvioida 12-18 kuukautta ohjelman päättymisen jälkeen; seminaareissa ja työpajoissa ammattimaisen sillanrakentajan käyttö edistäisi tieteidenvälisen vuorovaikutuksen toteutumisen.</p>		
Asiasanat	tutkimusohjelma, arviointi, tutkimusrahoitus, luonnonvarat, kestävä käyttö, metsätieteet, maatalous, poronhoito, kalankasvatus, vihreä kemia, ympäristö		
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Description

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Title	Research Programme - Sustainable Use of Natural Resources (SUNARE) 2001-2004, Evaluation Report		
Abstract	<p>The Board of the Academy of Finland decided on March 21, 2000 to launch a research programme for Sustainable Use of Natural Resources (SUNARE). The aim was to enhance high-quality research in the field and to promote cooperation between researchers from different fields for creation of new kinds of interdisciplinary methods needed to view the various dimensions of the sustainable use of natural resources. The SUNARE Programme ran from 2001 to 2004 and was jointly executed by the Academy of Finland, the Ministry of Agriculture and Forestry and the National Technology Agency, Tekes.</p> <p>In 2004, after the programme had ended, the Academy of Finland appointed an international expert panel to evaluate the programme. The panel was asked to assess the programme as a whole with a special focus on the following issues: planning of the research programme, success of the implementation of the programme goals and objectives, applicability of research and importance of research results as well as recommendations to the Academy of Finland for future programmes. This publication includes the report of the evaluation panel.</p> <p>The panel found the scientific quality of the projects mostly high and third of the projects exceptionally high. The criteria of multi- or interdisciplinarity in research was met only in 50 per cent of the projects, probably due to the fact that the criteria were not emphasised enough during the selection process. The promotion of transmitting the research data to end-users varied. Advisory groups including end-users were found extremely important in transmitting knowledge. Also national and international collaboration and networking varied considerably between the projects. It was noted that some project leaders did not contribute sufficiently time for supervision.</p> <p>According to the panel, the programme functioned reasonably well. The SUNARE programme provided for some projects an excellent platform to develop interdisciplinary research, while others exploited the funding opportunity to continue with disciplinary research.</p> <p>The key recommendations include: research proposals should be evaluated against the aims of a programme, not just on the basis of the scientific quality; evaluation of the effectiveness of a programme should be made 12-18 months after the programme end; and in seminars and workshops the use of a professional facilitator would encourage the desired level of interdisciplinary interactions.</p>		
Key words	research programme, evaluation, research funding, natural resources, sustainable use, forestry, agriculture, reindeer, fishery, green chemistry, environment		
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Preface

In 2000, the Academy of Finland established the Research Programme on Sustainable Use of Natural Resources (SUNARE) to support and encourage high quality research related to the sustainable use of natural resources in the natural and social sciences, economics and technology.

The programme aimed at supporting research on the use of natural resources from the perspective of a living and productive ecosystem, a life-cycle approach to the use of natural resources. This involved comprehensive environmental and economic analyses, where the use of natural resources, the risks involved in their exploitation and issues of social acceptability were viewed holistically. The programme also wanted to cover research on decision-making and policy instruments related to the use and management of natural resources.

SUNARE was conducted over a period of three years (2001–2004). It consisted of 28 research projects and consortia that covered a wide range of topics and disciplines.

The total funding for the three-year period amounted to 9.25 million euros.

In November 2004, the Academy of Finland convened an international evaluation panel to review the Programme. The members of the Panel were: Professor Anna-Lisa Lindén, Professor John Innes, Professor Anil Amarkandya, Professor Pietro Tundo and Professor Kristiina Vogt. Ditte Martensson served as secretary (see Annex 2).

This is the result of the evaluation of SUNARE.

December 2004

Anna-Lisa Lindén
Chair of the Evaluation Panel

1 Sustainable Use of Natural Resources Research

The concept of using multi- and interdisciplinary approaches to address global sustainability problems was formally articulated in the late 1980s. The concept of sustainability very broadly acknowledges the need to integrate information from the ecological, social, economic and political spheres to address and to produce solutions to these problems – a multidisciplinary approach that bridges the social and the natural sciences. Although the approach to sustainability first appeared in international policy documents, e.g. the Brundtland Report (1987) and Agenda 21 (1992), the concept is recognized and widely accepted by scientists. As a result, governmental agencies and other stakeholders have increasingly involved science when dealing with the trade-offs associated with the maintenance of economic, social and environmental values involved in the management of natural resources. For example, the sustainability concept was adopted under the umbrella of ‘ecosystem management’ as the paradigm directing the functioning of federal agencies in the USA in 1992. The Johannesburg conference in 2002 brought the social and economic dimensions of sustainability a big step forward by stating that the use of natural resources always has a background in human decisions and activities, with consequences for ecosystems in the short term as well as longer term perspectives. Natural and socio-economic systems are necessarily intertwined and closely related (Figure 1).

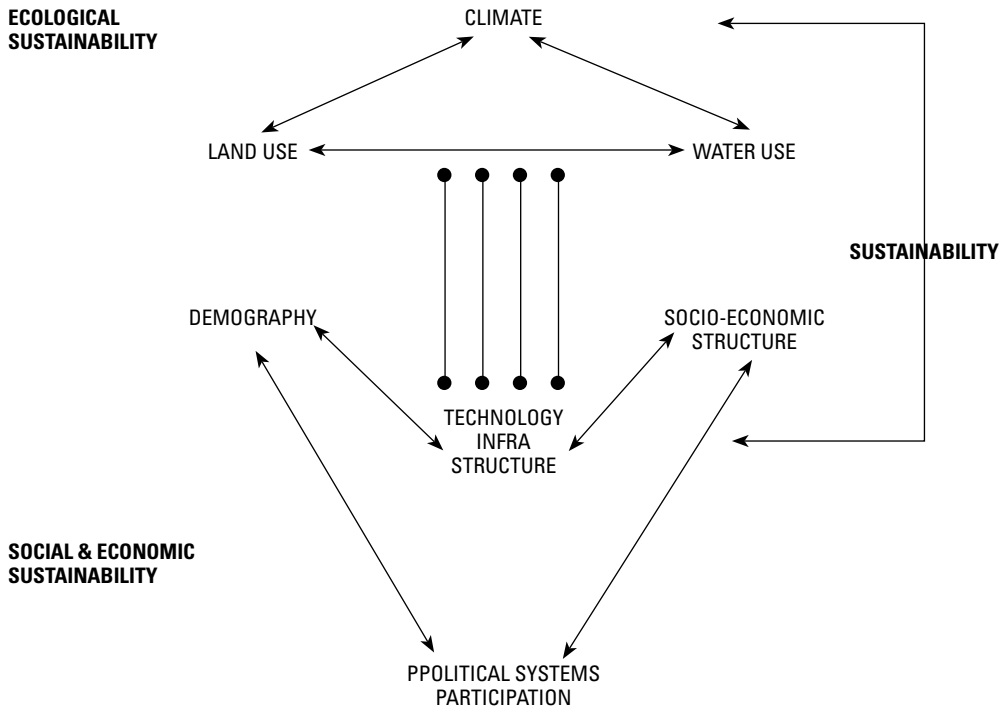


Figure 1. Sustainability including ecological and socio-economic perspectives. (Lindén A-L, 2001. *Allmänhetens miljöpåverkan*. Carlsson Bokförlag, Stockholm.)

However, frameworks for integrating these different disciplines have been elusive, even though considerable research is occurring globally to address sustainability issues. As sustainability issues are global, whoever provides frameworks for facilitating multidisciplinary research and shows how to credibly evaluate such efforts will have a high likelihood of providing leadership on these issues.

Funding agencies are facing the need to implement research programmes that integrate across disciplines to produce solutions to societal problems at the same time as the frameworks for those solutions are being developed. This means that funding programmes must be adaptive, as the process is a moving target and few models exist that can be used to inform how to structure and to evaluate programmes that aim to support multidisciplinary research. It does not mean that successful interdisciplinary programmes have not developed globally but these programmes have not been formally examined to determine which elements are needed to facilitate the transition of interdisciplinary programmes into the disciplinary contexts of academic institutions, and how funding agents can stimulate such research. This means that programme managers need to continuously learn as they are managing these programmes while providing applicants with clear guidelines on the criteria that will be used to judge the success of a project.

An assessment of the constraints and opportunities experienced by the SUNARE Programme could contribute to the development of models that would stimulate interdisciplinary research. The lessons learned from conducting such an analysis have implications beyond the SUNARE Programme itself. Since we do not have a general consensus on the criteria and indicators that should be used to determine the efficacy of programmes designed to integrate across the disciplines, such a review will help us to move towards the practical tools for its implementation.

2 The SUNARE Programme

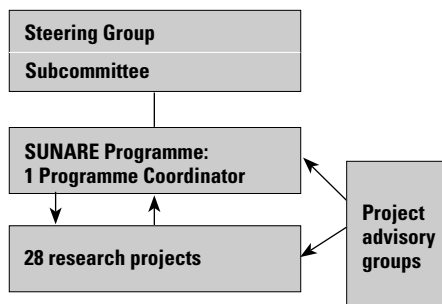
2.1 Background

The initiative for the Research Programme on Sustainable Use of Natural Resources (SUNARE) came from the Academy of Finland's Research Council for Environment and Natural Resources (Research Council for Biosciences and Environment since 2001). On the basis of the initiative, a meeting was arranged in January 2000, where potential interest groups (universities, research institutes, ministries, the National Technology Agency Tekes, and various foundations) expressed their views on the initiative's content. In February 2000, the Research Council for Environment and Natural Resources proposed The Sustainable Use of Natural Resources as a new research programme to begin in 2001. The Board of the Academy of Finland met in March 2000 and decided that the programme would be started. The Research Council for Environment and Natural Resources, the Research Council for Culture and Society and the Research Council for Natural Sciences and Engineering have participated in the programme.

SUNARE was set to be a three-year research programme, running from 2001 to 2004.

2.2 Organisation

In June 2000, the Board of the Academy of Finland appointed a Steering Group (see Annex 3) to plan the research programme, and a subcommittee to make the funding decisions by the Academy of Finland. The co-ordination of the programme was put out to tender. Based on competition the co-ordination was contracted to the University of Helsinki, Department of Forest Ecology. Dr. Liisa Saarenmaa was appointed as a full-time co-ordinator.



The work of the Steering Group, composed of members from the funding organisations, was greatest at the onset of the research programme. One of the duties of the Steering Group was to process plans of intent from researchers and suggest those that were to be invited to a second round. The programme subcommittee made the final decision on invitation.

The role of the coordinator was to interact with the different projects, to encourage inter-disciplinarity through seminars, and to collect and disseminate information on the projects.

The project advisory groups contained stakeholders and end-users that met with the researchers during the programme. Not all projects had project steering groups.

2.3 Programme Funding

The programme has been financed by the Academy of Finland, the Ministry of Agriculture and Forestry, and the National Technology Agency, Tekes.. The total funding is 9.25 million euros (FIM 45 million), with the Academy granting 8.07 million euros to the programme, the Ministry of Agriculture and Forestry 0.84 million, and Tekes 0.25 million euros. The financing periods for the research projects began in April 2001 and continued until 31 May 2004.

Part of the Academy's funding, about 0.4 million euros, was set aside to cover the coordinator's salary, printing materials etc.

(A list of projects and information on project funding are given in Annex 5).

2.4 Objectives and Research Projects in the Programme

The programme was set up to engage research within the following themes:

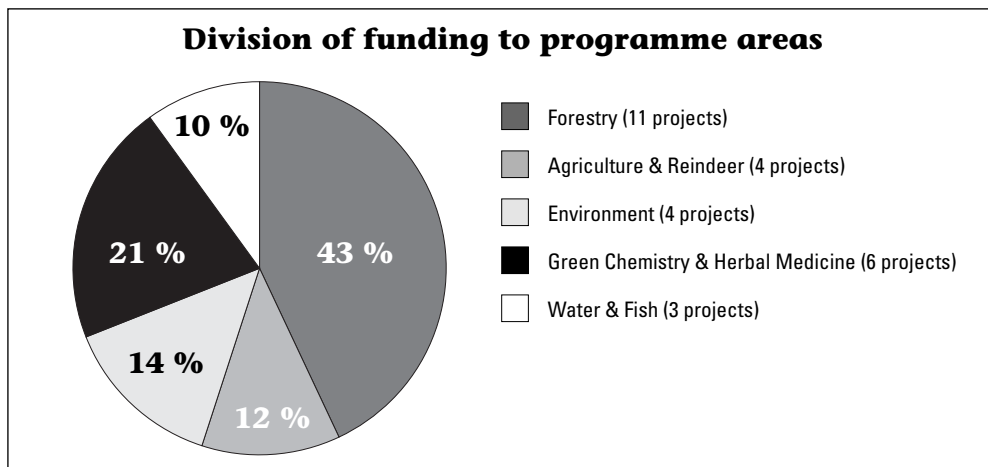
- Production and use of renewable raw material
- Development of sustainable nature tourism
- Planning and decision making concerning natural resources
- The use of new research methods like virtual technology, ecological modelling combined with geographic data

The main objectives of the Research Programme on Sustainable Use of Natural Resources that the researchers were supposed to address were:

- to develop interdisciplinary research on the sustainable use of natural resources;
- to promote the transmitting of related research data from its producers to its users;
- to create new national and international research contacts;
- to improve and diversify the sustainable management and use of renewable natural resources;
- to improve decision-making concerning the sustainable use of natural resources; and
- to promote researcher training in the field.

In all 184 plans of intent were submitted for the SUNARE Programme. In the first step, the Steering Group, composed of representatives from the funding organisations, suggested about 60 applications to be invited to submit a full proposal for evaluation, The full proposals were evaluated by international evaluators; by an expert panel or in cases where the topic of the proposal did not fit the expertise of the panel by individual external reviewers. Based on the evaluations the Steering Group ranked

the proposals and presented the suggestion for funding decision. Out of 184 plans of intent, 28 projects were supported. They were divided into five themes:



3 Evaluation Procedure

The announcement of a final evaluation of the SUNARE Programme and its projects can be found in the programme memorandum (p. 37); all programmes are routinely evaluated. The evaluators were appointed by the Academy of Finland, and the evaluation was scheduled to take place in the autumn 2004. The development of the timetable for processing self-evaluations and documents, and interviewing scientists from 28 SUNARE projects, coordinators, chair of the steering-group and stakeholders was performed by the programme coordinator in consultation with the chair of the evaluation panel.

Self-evaluations and documents were sent to the five panellists, which made it possible for them to evaluate the projects based on written material in advance. Two evaluators prepared the draft evaluations of each project and used these as basic material in interviewing the members of projects. However, the self-evaluations by the project leaders were extremely variable in quality. Some provided detailed information on the research, results, activities within the programme, national and international cooperation, scientific network, publications and student graduations from the project. Other self-evaluations were uninformative, providing little or no information about important aspects of their research. Some self-evaluations failed to provide a list of publications resulting from the research. This divergent material complicated considerably the evaluations being made by the panel.

Interviews took place in Helsinki over a three-day period in November 2004. Each project had sent a representative to the interview sessions. About fifty percent of the projects were represented by a PhD student. The other projects were represented by the project leader, or a senior member. In a very few cases they were accompanied by a PhD student.

All other documents, with a few exceptions, were sent to the evaluators in advance. These included:

- Programme memorandum
- List of projects
- Coordination reports (2001-2002, 2003-2004)
- Technical summary of the self-evaluation forms prepared by the coordinator
- Self-evaluation forms filled in by project leaders
- Publication lists and 1-10 key publications and PhD theses
- Drafts for synthesis book chapters 1-5 (Sustainable Use of Renewable Natural Resources – from Principles to Practices)

4 Overall Evaluation of SUNARE and the Projects

4.1 Introduction

The projects in the SUNARE Programme were evaluated in relation to the assignment (Annex 1), with a focus being on the extent to which they achieved the six objectives stated for the programme. The idea with a programme is to extend the possibility for research and widen the partners in the project in relation to stated objectives. Multi- and interdisciplinarity are a key objective not only for the SUNARE Programme (Research Programme SUNARE, 2000, p. 27), but for all programmes funded by the Academy of Finland (Academy of Finland, Research Programme Strategy 2/03, p. 49). However, the definitions of multidisciplinary and interdisciplinarity were not defined in the initial programme announcement. These terms are defined very differently by discipline and by the resource areas so that it is important to define the terms especially when this is one of the key objectives of SUNARE that is being evaluated. Even though these terms were not defined by SUNARE in 2000 (p. 7), a definition is provided in relation to the funding strategies for programmes (Viinikainen cited in Research Programme Strategy, p. 49). A multidisciplinary project involves researchers from two or more disciplines where all researchers address a problem from their disciplinary perspective respectively (Figure 2a). The outcome of the projects is the added knowledge that is gained by incorporating several disciplinary perspectives. An interdisciplinary research project addresses a problem that is valid for all members in the projects, irrespective of disciplinary background. There must be an overlap in the theoretical perspectives that are adopted, as well as an overlap in the empirical material that is used in the joint analysis (Figure 2b). In addition to this, additional knowledge may be the outcome of bringing together researchers representing different disciplines in the project.

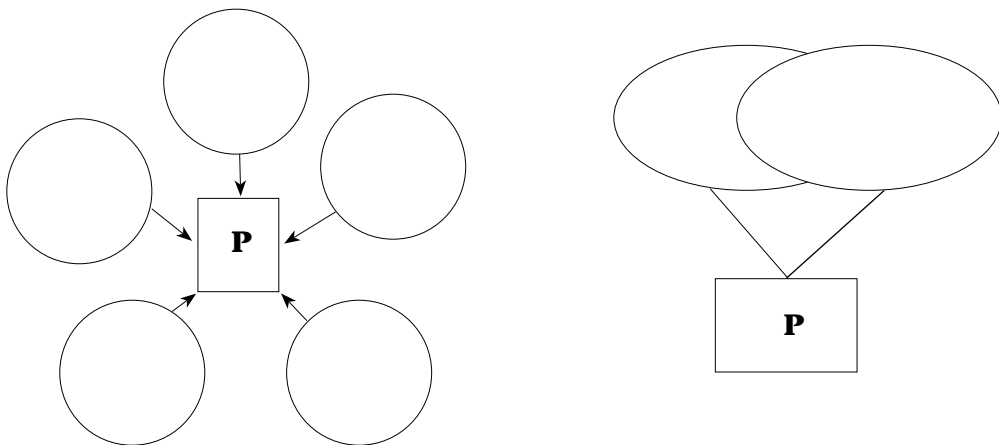


Figure 2 a. and b. A multidisciplinary project and an interdisciplinary project respectively. P =problem

A problem in the selection of applications for funding is to define the criteria for evaluating multidisciplinary and interdisciplinary research proposals. The fundamental idea with a multi- or interdisciplinary projects is that the results will produce a wider knowledge and understanding of a phenomenon than could be done by a project that is based on a single discipline. However, some additional criteria can be formulated:

- The research problem must be relevant and clearly formulated.
- The combined subprojects have to be of good quality.
- The integration of subprojects and disciplines has to be demonstrated.
- The competence of researchers is important.

There is no question that scientific quality is the main criterion in research selection processes, not only for the joint proposal but for every subproject integrated in the project. If none, one or two out of three disciplines/subprojects/partners in the project does not show an acceptable scientific standard from theoretical aspects, methodological aspects or scientific competence, the project as a whole should not be selected for consideration (Figure 3). This is a very important point, and one that proposers of multi- or interdisciplinary projects often forget. It is also critical for both proposers and evaluators to recognize that there are fundamental differences in the ways that scientists from different disciplines approach their research and publish the outcomes of that research. For example, a single-authored book is generally considered much more highly in the social sciences than in the natural sciences, with the latter placing much greater emphasis on peer-reviewed journal articles.

In step 2 of the process, the applications with an acceptable scientific standard proceed to a second step in the evaluation for economic funding.

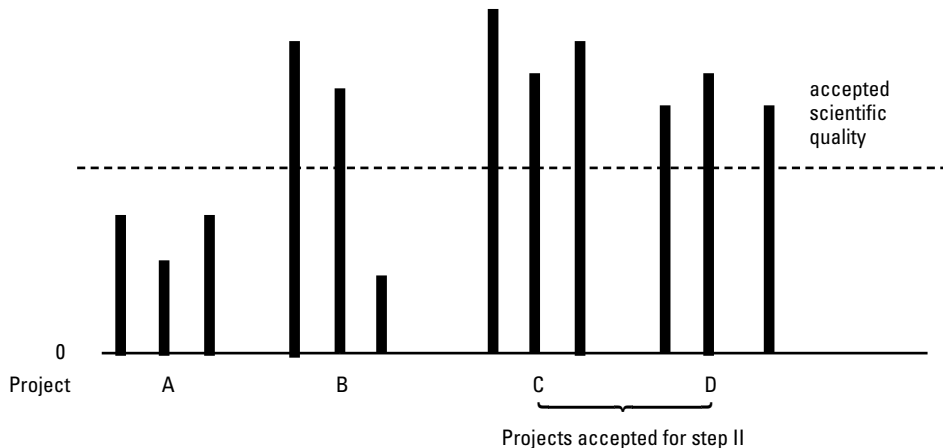


Figure 3. Evaluation of multi- and interdisciplinary research proposals in a two-step process

(Svedin U, Lindén A-L, Magnusson D, Stendahl O, Tibell G, Vågerö D, Öquist G, 1999. *Tvärvetenskap – Hur, av vem och varför?* FRN, Stockholm)

A two-step process in the evaluation of research proposals is quite normal. The proposals in the first step often have a more or less preliminary status. Those

selected to proceed are provided the opportunity to provide a fuller explanation of their proposal before the second step, involving the selection of those to be financed. However, with multi- and interdisciplinary research, it is the full application that is evaluated in two steps. The first step identifies those projects with acceptable scientific standards. The second step identifies those that are most suitable for funding.

4.2. Scientific Evaluation of the Programme

The projects in the SUNARE Programme were first and foremost selected by their scientific quality, according to the normal procedure of selecting research proposals shown above. The evaluation panel rated one third of the projects as excellent. A total of 117 reviewed articles in scientific international journals have been published from the SUNARE Programme (Table 1), although there is significant variation in the article productivity amongst projects. Some projects have very few publications of any kind.

Table 1. Published internationally reviewed articles arising from the SUNARE Programme

Sector	Number of articles	Mean	Number of projects
Forestry	48	4.0	11
Agriculture & reindeer	9	1.8	4
Water & fish	21	7.0	3
Green chemistry	32	5.3	6
Environment	7	1.8	4
Total	117	4.0	28

The programme areas *Water & Fish*, *Green Chemistry* and *Forestry* were the most active in writing articles in peer reviewed international journals, although there was some variation among projects. *Agriculture and Reindeer* and *Environment* had fewer articles published. However, it was often difficult to tell whether an article was the result of the SUNARE Programme, or whether it was simply completed within the time period covered by the funding. Exclusion of such publications would reduce the overall number of publications arising from the projects. However, there may still be a number of articles arising from the research that are still to be written.

Although it is difficult to judge a project's scientific quality during the short time that the evaluation panel had at its disposal, some conclusions concerning the scientific quality can be drawn.

Conclusions

- Scientific quality of many of the projects was high. More than one third of the projects were considered exceptional (11 out of 28). Some projects provided insufficient details in the self-assessment to make any judgement.
- Some projects had very few publications

4.3 Contribution to the Implementation of SUNARE's Goals and Objectives

The main objectives of the Research Programme on Sustainable Use of Natural Resources (SUNARE) were:

- to develop interdisciplinary research of the sustainable use of natural resources; (1)
- to promote the transmitting of related research data from its producers to its users; (2)
- to create new national and international research contacts; (3)
- to improve and diversify the sustainable management and use of renewable natural resources; (4)
- to improve decision-making concerning the sustainable use of natural resources; (5)
- to promote researcher training in the field. (6)

Few of the projects indicated that they had actively considered all the SUNARE objectives of the SUNARE Programme during their project planning. It may be impossible to address all objectives in a research project, but a number of them ought to be a necessary part of any project. In particular, developing interdisciplinary research should have been a requirement for all projects. The self-evaluation forms were used to assess the extent to which projects met the individual objectives (Table 2).

Table 2. Evaluation of SUNARE objectives 1-6 addressed by projects in research sectors

Programme area	Total no of projects	OBJECTIVES					
		1	2	3	4	5	6
		No of projects with objectives met*					
Forestry	11	5	5	3	5	3	3
Agriculture & reindeer	4	3	2	2	3	3	3
Environment	4	3	0	2	0	0	2
Green chemistry	6	1	2	2	2	0	3
Water & fish	3	3	3	2	2	3	3
Total	28	15	12	11	12	9	14

*Objective 1 refers to interdisciplinary research, objective 2 refers to transmitting data to users etc. (See the paragraph at the top of the paper referring to the objectives)

Very few projects (3) were classified as being relevant to all objectives. Eleven projects met at least three of the objectives. Six projects were not considered as meeting any of the SUNARE objectives. In the following, the programme is evaluated taking into consideration the extent to which the joint research fulfils the SUNARE objectives.

4.3.1 To develop interdisciplinary research of the sustainable use of natural resources

Few of the projects in the SUNARE Programme appeared to have taken this objective seriously. In those that did, the project leaders indicated that they had attempted to address this objective when writing the application, and had organised projects combining several disciplines. The SUNARE Programme provided an opportunity to undertake research that would not have been funded as individual projects. About half of the projects estimated that they could get funding as a project in an ordinary (single discipline) process, but their research problem addressed themes relevant for SUNARE, so they had applied to SUNARE for funding. Several of these projects coordinated a number of researchers from the same discipline and in some cases they were working within the same department. Consequently, it is concluded that the initial project selection process failed to address the main goal of the SUNARE Programme.

In retrospect, 15 projects could be considered as being consistent with the multidisciplinary or interdisciplinary objective of the SUNARE Programme (See Table 2). The remaining projects could have been funded through traditional channels within the Academy.

The first coordinator and the chair of the Steering Group for the programme indicated that this objective was not stressed in the verbal presentation of the SUNARE Programme, nor was it used in the selection of applications proceeding to step 2 during the project selection. Scientific excellence was by far the most important criterion used to judge project quality. During the programme evaluation, the coordinators themselves were unclear of the differences between multi- and interdisciplinary research.

The coordinators promoted contacts between the projects selected for the SUNARE Programme by arranging seminars at least once a year. The aim of these seminars was to promote interdisciplinary networking. The seminars were appreciated by a number of the project members. Some project members heard new perspectives that they could use in their research, new colleagues and, in a few cases, new researchers who could be integrated into the ongoing research. There is no doubt that the seminars were important and promoted extended multidisciplinary networks, but they do not appear to have increased the amount of interdisciplinary research within the ongoing projects. Some project representatives said that smaller, more focused seminars would have been more interesting. This is also reflected in the coordinator's report: "Due to the extent of the programme, it was difficult to find topics that interest all participants". A few of those interviewed indicated they had found the seminars of little value. This suggests that they had failed to make use of the possibilities for interdisciplinary networking, and had remained too focused on their own disciplinary areas. Many scientists are unaccustomed to such an approach, and need help from skilled facilitators in moving to this level.

The coordinator also organized getting researchers together from different projects to write chapters for a synthesis book. Some of the PhD students highly appreciated

being part of this project, giving them an understanding of other disciplines, while others expressed that it was a time-consuming and of little value to them. As with the annual seminars, an opportunity seems to have been missed. Instead of having largely disciplinary chapters arising from individual projects, the chapters could have focussed more on specific problems associated with the sustainable use of natural resources, making scientists from different projects work together to address these problems from different perspectives.

Conclusions

- About 50% of the projects did not meet the criteria of multi- or interdisciplinarity in their research, probably because it was not a criterion during the selection process.
- The aim of the SUNARE Programme coordinator to promote collaboration (such as through the seminars and the synthesis book) created an understanding of other discipline's research concepts but could have been developed further.

4.3.2 To promote the transmitting of related research data from its producers to its users

Projects in any research programme differ in their capacity to transmit research data that can be utilized by the end users that varies depending on whether the research is based on basic or applied research. Normally most research projects are more closely aligned with basic research which is more difficult to transmit to an end-user. Based on the material provided to the evaluation panel, most of the projects funded by the SUNARE Programme were basic research projects (Table 2). However, a small number of projects had already identified the importance of end-users when planning and writing their application and included the end-users as important partners in collecting facts and empirical material. For these few projects, communicating the results to end-users were more or less integrated into the research process. In fact, the end-users were already implementing the results from these projects during the life of the project.

Shortly after the start of the programme, a decision was made that projects should have advisory groups. Almost all projects appointed an advisory group consisting of researchers, stakeholders and end-users. Some projects failed to keep their advisory groups active, suggesting that some project leaders underestimated the sustained efforts that this involves. Others benefited greatly from their steering groups, not least in the extent of communication with end users in the group. Those projects generally benefited from the establishment of an advisory group.

Most projects planned to write a report specially for users, a few projects arranged yearly seminars and wrote articles in local newspapers. These plans were normally not identified at the start of the project, but appeared to be a reasonable strategy when the project came to a final phase. Elsewhere where the application of research results is considered to be an important part of a research programme, project applicants are encouraged to consider right from the start how the results of their research

might best be implemented. Experience shows that this occurs most effectively when end-users are actively involved with the planning and implementation of the research. There was little evidence of active transmittal of results to end-users through, for example, newsletters or extension articles. In a few cases, projects had attempted to do this, but they were exception.

Conclusions

- Most projects had no plan in advance how to transmit results to users.
- Writing a final report or popular articles in the press were the most common strategies.
- A small number of projects planned their dialogue with users by collecting data during their fieldwork, arranged regular meetings or yearly seminars. Some results were implemented on behalf of these strategies.
- The advisory groups sometimes played an important role for projects, advisory groups that included end-users were extremely important for transmitting and discussing results.

4.3.3 To create new national and international research contacts

Finland is a small country. Many national researchers know each other very well. This situation facilitates the establishment of national networks. The establishment of international networks needs much more energy and creativity. Most senior researchers involved with the SUNARE projects had several forms of international contacts before this programme started, such as existing collaboration, specialised networks, and regular attendance of conferences and workshops. Some senior researchers are themselves well known and have strong international reputations.

Establishing an international network is more difficult for young researchers and especially for PhD students. In a number of projects, PhD students had attended conferences and had met colleagues in other countries. Some had ongoing plans to collaborate in forthcoming projects. This should be seen as a successful outcome for SUNARE.

However, many projects had difficulties placing their project within an international context and had few or no international networking related to their project. Most of these projects belonged to the group of projects that were very weak in interdisciplinarity, or had been organised by members from one discipline or even just one department.

In all, about one third of the projects were able to demonstrate that there was an international network actively related to the ongoing project.

A second strategy to build an international reputation and contacts is to publish results in international scientific journals. Publishing results in Finnish journals and newspapers is of importance in disseminating results to a national audience and users. Writing articles to be published in international journals fulfils the

purpose of building international respect for a particular piece of research and for the researcher that has conducted it. As indicated above, the tradition of writing articles for international journals differs between disciplines. In humanities, writing reports and books is very often the preferred strategy for the publication of results. This is also valid in the writing of a PhD thesis. This tradition, however, seems to be changing in the Nordic countries. When analysing the number of internationally reviewed articles from the SUNARE projects, it is important to keep in mind that differences among research sectors may include writing books and reports that are not included in the reporting of journal articles.

Conclusions

- There are differences among the projects in international networking – in attending conferences, collaboration, and contacts as well in publishing articles in peer reviewed international journals.
- A number of projects are very productive in all these respects.
- Some PhD students have had benefits from their international contacts, not least in relation to the planning of new projects.
- Some projects have published their results sparsely and mainly in Finnish.
- Some projects were unfamiliar with work in their respective areas occurring outside Finland.

4.3.4 To improve and diversify the sustainable management and use of renewable natural resources

The SUNARE Programme had duration of three years. This is an extremely short time to have a significant impact on the management and use of renewable resources. A few projects have provided users with results that have been implemented. Most of these projects planned from the outset to have a close contact with end-users (See 4.3.2). Involvement of advisory groups in projects was generally seen as being positive, particularly when they involved end-users. In general it would have been more efficient to have end-users involved in projects from the beginning, either directly in the project or as advisory group members.

Over a longer term, results from the projects in the SUNARE Programme may influence the sustainable management and use of renewable resources. However, it is very hard to make any assessment of this at the current stage of the programme.

Conclusions

- Continuous involvement of end-users right from the start is important in fulfilling this objective.
- Involvement of advisory groups in projects was generally seen positive, particularly when they involved end-users.

4.3.5 To improve decision-making concerning the sustainable use of natural resources

For the same reason as with SUNARE objective four, it is very difficult to evaluate the fulfilment of the objective to improve decision-making (See 4.3.2, and 4.3.4). In the long term, the results from the programme may influence decision-making. In the self-evaluations and interviews, it was indicated that some projects had decision support as an objective, but they presented neither tools nor results that would indicate that they had provided adequate decision support to end-users.

Conclusions

- It is very difficult to evaluate this objective at this stage of the programme.

4.3.6 To promote researcher training in the field

A three-year programme is very rarely enough for completing a PhD in the Nordic countries. Some projects included PhD students who had already started with their studies. A number of them were therefore able to fulfil either a PhD examination or a Licentiate examination within the three years. A large number of MSc's have been produced during the programme (Table 3). According to the interviews, a large number of PhD examinations will be completed within the next two years. The normal time taken by a Finnish PhD student to graduate is 4-5 years. It is almost impossible to complete a PhD degree within a three-year programme, although one PhD student is reported to have done so.

Table 3. Graduations from projects within the SUNARE Programme.

Sector /Finalised:	PhD	Lic.	MSc.	PhD within 2 years	No. projects
Forestry	5	3	10	15	11
Agriculture & reindeer	3	0	3	5	4
Water & fish	3	0	7	6	3
Green chemistry	6	3	1	9	4
Environment	1	2	6	4	6
Total	18	8	27	33	28

Another way to promote researcher training is to organise research schools. The coordinators tried hard to get funding for a SUNARE research school, but failed. The students they would have liked to have attended such a research school, which would have widened their education and enabled them to be better prepared for interdisciplinary research, according to interviews. Some students were able to attend courses in Nordic countries and other courses outside their department. The possibilities to do so were evaluated to be very fruitful for their work within SUNARE but also in gaining contacts and planning for upcoming projects.

A third way to promote researcher training is to have a good supervisor. In a few projects, the quality of graduate supervision seems to have been very poor, partly because the supervisor was too busy to pay sufficient attention to the students. A project leader with sufficient time supervision is a criterion that is important for committees to consider when making decisions about funding.

Conclusions

- Promote researcher training by specialized courses or research schools within the programme.
- Make sure there is time enough for seniors or project leaders to supervise students and co-ordinate research in the projects. This could be easily determined by assessing the percentage of time that a researcher will allocate to a project and how many other projects they are also providing the leadership. If the project leader has more than half of his/her time committed to other projects, it might be worth reconsidering whether to fund the project.
- There is need for more time for a PHD student to satisfy the requirements of their programme than what a three-year funded project will provide. It may be worth considering how to bridge these students beyond the current project so that they do not have to shift their research to other topics and potentially prolonging the time required to obtain this degree – either within the programme or by providing a year or two of extended funding for PhD students as an integral part of a proposal.

4.4 Functioning of the Programme

The organisation of the SUNARE Programme roughly consists of a Steering Group (SG), a coordinator, 28 projects and, in most cases, their advisory groups (See 2.2).

The Steering Group for the programme was very active in organising the programme and in the selection of applications considered for funding. The three funding organisations, the Academy of Finland, the National Technology Agency, Tekes and the Ministry of Agriculture and Forestry were represented in the SG. After the selection procedure, Tekes and the Ministry of Agriculture and Forestry each funded only one project. This was because the criterion of excellent science, which dominated the selection procedure, meant that the requirements of these two organizations were not met. This may reflect in part a cultural view held by some scientists that “applied” research is in some way less rigorous than “pure” research. The activity of Tekes and the Ministry of Agriculture and Forestry in the Advisory Group and in the programme suffered from these circumstances and most of their ambitions were centred in the two projects that they financed. The activities of the SG as a whole seem to have functioned well, especially in the beginning. However, their activity decreased over time. There is an intention to organise a seminar when the book on sustainability is published. This publication will contain chapters from most projects within the programme. The book will be a joint endpoint of the programme and is anticipated eagerly by the SG. The researchers, on their side, report that the book will be a document for scientists to a greater extent than for end-users or stakeholders,

suggesting that there is a disconnect between the expectations of the researchers and the end-users.

The coordinators have played a key role in managing the programme. They have been in regular and constant contact with every project. They have organised seminars, which have been appreciated by several of the projects. They have taken part in seminars and meetings in the projects. The coordinators actively tried to organise a research school/course for students in the projects. This idea failed due to lack of financial resources, although a number of applications were written to get them funded. The engagement of the coordinators in the programme was appreciated by the researchers. During a period of a month in the middle of the programme there was no coordinator working. The first coordinator had left for a new employment and the second one was employed in the programme a month afterwards. The new coordinator had difficulty familiarizing herself with the programme, its organisation, the 28 projects, and the 150 persons involved. As a result, there was a break in activities and seminars. An overlap in time between the first and the second coordinator could easily have solved most of these problems.

The establishment of steering groups for each project was appreciated by most of the projects. Members in the groups played an important role in communication with end-users (See 4.3.2). However, communication might have been better: the students who were interviewed indicated a need for courses, and for information bulletins about news, conferences, seminars, important national and international projects and events.

For some projects the SUNARE Programme created a platform to get additional funding from other organisations outside the academic world.

Conclusions

- The programme appears to have functioned well, with some important exceptions.
- The low level of financing from other funding organizations compared to the Academy of Finland seems to have stemmed from a tension between the desire to support basic science versus applied science.
- The lack of overlap in timing the succession of coordinators resulted in a short time period where the projects functioned on their own without having contact with the SUNARE Programme and a reinforcement of SUNARE objectives
- The failure to establish a research school or courses meant that a number of students missed the opportunity to get into contact with students from other disciplines. Some students overcame this situation by attending Nordic courses.
- For some projects, the SUNARE Programme provided an excellent platform to develop interdisciplinary research funding and to obtain additional funding from other agencies.
- During the evaluation panel interviews, project representatives were still mentioning the need to plan some final event where all SUNARE Programme projects could be show cased.

4.5 Added value of the Programme

The idea of a programme is to provide possibilities for establishing research which could not be funded as a normal project. In the evaluation of the applications, the scientific quality was the main criterion. As a result, a number of applicants were funded to continue with their normal, disciplinary, research activities. Although about half of the projects reported such a situation, others developed new contacts and established multi- or interdisciplinary research. A number of projects reported that they had benefited a lot from being an SUNARE project in terms of extra funding, new international contacts and in planning for new interdisciplinary projects.

Conclusions

- Many have gained ideas from the SUNARE seminars, new platforms and colleagues. Others simply exploited the funding opportunity to continue with disciplinary research.
- The book is considered a key output by the programme coordinator. Unfortunately, this view is not shared by some of the scientists, as they believe that it will be read mainly by SUNARE scientists.
- The book may have been useful in creating active contacts among some researchers, and it could be valuable to undertake such an activity earlier in a programme.

5 Recommendations for the Future

Policy for the programme

- Project requirements of the SUNARE Programme should have been clearly stated at the beginning as well as the criteria by which the success of the projects would be evaluated at the conclusion of the programme. New requirements should not be added after the research project has been approved for funding and it should be made sure that the time schedule established by the programme are adhered to.
- The evaluation criteria for selection of projects for funding must be clearly defined for each step in the selection process, and those making the evaluation should utilize these criteria.
- As multi- and interdisciplinarity is the main objective for all programmes according to the policy of the Academy of Finland, proposals should be evaluated against this objective.
- Research proposals should be evaluated against the aims of a programme, not just on the basis of scientific quality.
- The extent to which a project meets a programme's objectives should be weighted when making evaluations, as some objectives will be more important than others.
- Some funds should be held back during the initial project awards so that under-represented areas can be targeted in a later call.
- Evaluation of the effectiveness of a programme (an entirely separate issue from the scientific quality of the programme) should be made 12-18 months after the end, based on project reports, interviews and questionnaires with end-users.
- There should be sufficient funding allocated within projects to allow for networking, contacts and international liaison, if this is a desired objective.

Coordinators' role

- Encourage greater interaction amongst projects by seminars, workshops, courses for students and informative bulletins/newsletters. In cooperation with the Academy's webmaster, create a more vivid and informative website.
- In seminars and workshops, use professional facilitators to ensure that the desired level of interdisciplinary interaction occurs.
- The programme coordinators should be administrators placed within the Academy of Finland.

- Provide programme evaluators with complete self-evaluations, publication lists and other programme documents for the evaluation of projects as well as the programme.

Project requirements

- Proposals should be asked to relate their project to the programme objectives to be considered for funding. Various techniques, such as language ladders, exist that can help to do this.
- Projects should include end-users in the planning, project communication and results dissemination.
- A plan for dissemination of results, including student graduations, should be included in the proposal. Use of alternative information dissemination methods should be considered – paper or electronic newsletters, study tours, special seminars/workshops/training sessions.
- Research proposals should include sections where researchers place their work into an international context. How does their work fit into global knowledge about particular phenomena? Which important research groups or contacts could be valuable for the project.
- Researchers should provide annual progress reports for the coordinator.
- Evaluation of projects should be at the end of the project after final reports have been submitted.

Future Evaluation Processes

There were some severe problems during the panel evaluation process, which easily could be improved.

- Criteria for the evaluation process ought to be set at the beginning of the programme.
- The self-evaluation forms should be checked by the coordinator; incomplete forms should to be returned for completion.
- A full list of publications should be submitted, and the list should separate those publications arising from the research funding.
- The project leader should be present during the interview session.
- PhD students should have a separate interview session where issues such as supervision, courses coordination and progression in thesis work could be important issues for discussion.

- Satisfactory completion of the self-evaluations and final reports should be a necessary condition of the funding, and a financial holdback of about 10% of the project budget could focus the attention of researchers on completing their commitments to the programme.

Annex 1

The Assignment

Evaluation of the Research Programme on Sustainable Use of Natural Resources (SUNARE)

The Academy of Finland has launched the evaluation process of the Research Programme on Sustainable Use of Natural Resources. The scientific evaluation of the programme will be carried out by an international evaluation panel. The members of the evaluation panel are Professor Anna-Lisa Linden from Lund University, Sweden (Chair), Professor John L. Innes from the University of British Columbia, Canada (Vice Chair), Professor Anil Markandaya from the University of Bath, UK, Professor Pietro Tundo from Ca'Foscari University Venice, Italy, and Professor Kristiina Vogt from the University of Washington, USA. With this assignment we, on behalf of the Academy of Finland, confirm your membership in the evaluation panel of the SUNARE Research Programme.

The objective of the evaluation is to estimate to which degree the SUNARE Research Programme has succeeded in fulfilling the objectives originally set for it in the Programme Memorandum. Of specific interest are the programmatic approach, added value and programme impacts, interdisciplinarity, applicability of research, networking and dissemination of results.

In the Evaluation Report, the panel is expected to assess the programme as a whole and reflect especially the following issues:

1. Planning of the research programme
 - Preparation of the programme and planning of the contents of the programme
 - Research projects funded and funding decisions in creating the necessary preconditions for the programme
2. Scientific quality of SUNARE
 - Scientific quality and innovativeness of the research
 - Scientific competence of the consortia
 - Contribution to the development of sustainable use of natural research
3. Success of the implementation of the programme goals and objectives
 - Concordance with the objectives of the research programme
 - Functioning of the programme
 - Added value of the programme
 - Contribution to enhancing inter- and multidisciplinary in research
 - Scientific and administrative coordination
4. Contribution to researcher and expert training
5. Collaboration and networking
 - Collaboration within the programme

- Collaboration with other Finnish groups
 - International cooperation
 - Collaboration with the end-users
6. Applicability of research and importance to the users
- Contribution to promoting the applicability of research results
 - Relevance and importance to the users
 - National and international impact of the programme
7. Recommendations for the future (including the justification for the recommendations)

The time and place for the panel work have been decided to be 24-26 November in Helsinki at the Academy of Finland, Vilhonvuorenkatu 6. The preliminary schedule for the panel is as follows:

- * 23 November Arrival in Helsinki, get-together dinner
- * 24-26 November Panel meeting at the Academy of Finland
- * 26 November Departure from Helsinki – late flights, after 6 pm

The work will include examination of the reports, self-evaluation assessments, publications and other products of the programme and discussions with the Programme Steering Committee, key stakeholders, researchers, and programme coordination during the panel's meeting. There will also be periods reserved for intensive work of the panel including the preparation and drafting of the Evaluation Report. Technical assistance will be provided during the visit.

Further details of the meeting will be sent to you later.

Tuula Aarnio	Anneli Jalkanen
Programme Manager	SUNARE Programme Coordinator
Academy of Finland	University of Helsinki

Annex 2: SUNARE Evaluation Panel

Short biographies

Chair:

Professor Anna-Lisa Lindén

Department of Sociology
Lund University
Sweden

Anna-Lisa Lindén, Professor in Sociology at Lund University, Sweden. She has written several books and articles within her fields of research e.g. environmental impacts of food and energy consumption; travel patterns and environmental impacts; the efficiency of policy instruments on individual behaviour; social differentiation in urban systems; lifestyles and public health. She is a board/committee member in research funding agencies in Sweden.

Vice Chair:

Professor John Innes

FRBC Chair of Forest Management
Department of Forest Resources Management
University of British Columbia
Vancouver, BC,
Canada

John Innes, Professor and FRBC Chair of Forest Management at the University of British Columbia. He has written numerous articles and books related to various aspects of the environment and forests, initially focussing on environmental pollution and more latterly on issues related to the sustainable management of natural forests, particularly forests. He has had experience in reviewing research proposals and completed programs in a range of areas, including Canada, the USA, Italy, Belgium, the United Kingdom and the European Union.

Members:

Professor Anil Markandya

Lead Economist, ECSSD (Temporary)
The World Bank, Washington DC
USA

University of Bath
Dept of Economics and International Development
Bath
United Kingdom

Anil Markandya, Professor of Economics at Bath University specialises in environmental and natural resource economics. He is author of around two hundred books, monographs, articles and reports on environmental economics, including the landmark *Blueprint for a Green Economy* (1989) *Green Accounting in Europe*, *Reconciling Trade and Development* and *Cleaning the Ganges*. He has held academic positions at the universities of Princeton, Berkeley and Harvard in the US and at University College London. His current research interests are in environmental valuation and sustainable development and climate change.

Professor Pietro Tundo

Organic Chemistry
University of Ca' Foscari of Venice
Italy

Pietro Tundo is Full Professor of Organic Chemistry at the University of Venice. He was guest professor at College Station (Texas, 1979-81), Postdam (New York, 1989-90), and Syracuse (New York, 1991-92). His scientific interest is in new methods of continuous-flow organic synthesis, selective methylations with low environmental impact, chemical degradation of toxic compounds, phase-transfer catalysis, synthesis of crown-ethers and functionalised cryptands, and supermolecular chemistry. He is author of 240 scientific publications, one book and 29 patents. His research activities in the field of clean processes led to the development of the Gas-Liquid Phase Transfer Catalysis. The GL-PTC was used for the synthesis of non-steroidal anti-inflammatory drugs. He conceived reactions for degradation of toxic compounds based on the anionic activation and on the hydrodehalogenation reaction.

Professor Kristiina Vogt

College of Forest Resources
University of Washington
Seattle, WA 98195-2100
USA

Kristiina Vogt is Professor of Ecosystem Management at the University of Washington's College of Forest Resources, co-coordinator of the Forest Systems and Bioenergy program at UW, and President of CAPEIntl. She has researched the impact of human activities within our landscape and determining which tools effectively analyze whether our activities will cause systems to become non-sustainable in North and South America and in Asia. She is the author or co-author of four books, including *Ecosystems: Balancing Science with Management* (also translated into Chinese), *Environmental Issues in Pacific Northwest Management* (NRC), and *Forest Certification: Roots, Issues, Challenges and Benefits*. She has published over 100 refereed articles ranging from global forest carbon budgets, the role of species in conservation, nutrient cycling, invasive species, and frameworks for including human values and non-human constraints in ecosystem based assessments, and bioenergy and linking forests to newly arising technology platforms.

Annex 3: SUNARE Steering Group

Steering Group 2000

Chair:

Director General Lea Kauppi, Research Council for Biosciences and Environment

Members

Professor Marja Järvelä, Research Council for Environment and Natural Resources

Professor Pentti Yli-Jokipii, Research Council for Environment and Natural Resources

Professor Marja-Liisa Riekkola, Research Council for Natural Sciences and Engineering

Docent Riitta Keiski, Research Council for Natural Sciences and Engineering

Professor Seppo Sajama, Research Council for Culture and Society

Research Director Kari Ebeling, Academy of Finland Board

Chief Technology Adviser Christine Hagström-Näsi, National Technology Agency (Senior Technology Adviser Helena Manninen as her deputy)

Counsellor of Forestry Liisa Saarenmaa, Ministry of Agriculture and Forestry (Senior Adviser Matti Heikurainen as her deputy)

Steering Group 2001-2003:

Chair:

General Director Lea Kauppi, Research Council for Biosciences and Environment

Vice chair

Professor Mats Gyllenberg, Research Council for Natural Sciences and Engineering

Members

Project Manager Christine Hagström-Näsi, National Technology Agency (Senior Technology Adviser Helena Manninen as her deputy)

Senior Adviser Matti Heikurainen, Ministry of Agriculture and Forestry (Secretary General Juhani Tauriainen as his deputy)

Professor Marja Järvelä, Research Council for Environment and Natural Resources

Professor Marja-Liisa Riekkola, Research Council for Natural Sciences and Engineering

Professor Eevi Rintamäki, Research Council for Biosciences and Environment

Professor Juha Tuomi, Research Council for Biosciences and Environment

Programme Director Leena Paavilainen, Wood Wisdom Research Programme

Steering Group 2004:

Chair:

General Director Lea Kauppi, Research Council for Biosciences and Environment

Members

Technology Manager Christine Hagström-Näsi, National Technology Agency
(Senior Technolgy Adviser Helena Manninen as her deputy)

Senior Adviser Matti Heikurainen, Ministry of Agriculture and Forestry
(Secretary General Markku Järvenpää as his deputy)

Professor Kyösti Pekonen, University of Helsinki, Research Council for Culture and Society

Professor Kari Rissanen, University of Jyväskylä, Research Council for Natural Sciences and Engineering

Professor Eevi Rintamäki, University of Turku, Research Council for Biosciences and Environment

Programme Director Leena Paavilainen, Wood Material Science Research Programme (2003-2006)

Annex 4: Subcommittee Appointed by the Board of the Academy of Finland in 2000

Members of the Research Programme Subcommittee:

Director General Lea Kauppi (Chair)

Professor Pentti Yli-Jokipii

Professor Marja-Liisa Riekkola (Vice Chair)

Professor Seppo Sajama

Annex 5: SUNARE Research Projects and their funding

Forestry

1. Finer, Leena

Advanced tools for forestry environmental management (FEMMA)

453,451 €

2. Haila, Yrjö

Socio-economic conditions sustainable use of wood fuel

234,178 €

3. Kellomäki, Seppo

Silvicultural strategies for managing wind- and snow-induced risks in forestry (SilviRisks)

246,412 €

4. Koricheva, Julia

Mixed forest stands as means of sustainable forest management

345,547 €

5. Kouki, Jari

Linking the ecological, economic, social and legal dimensions of forest ecosystem management (LINK-FOREST)

420,486 €

6. Liski, Jari – Mäkipää, Raisa

Integrated method to estimate carbon budgets of forests

118,950 €

7. Loukola, Olli

Sustainability in forest use: Values affecting decision-making – a social, scientific and ethical analysis

782,622 €

8. Orell, Markku

Landscape level indicators for sustainable use of forests

374,684 €

9. Puttonen, Pasi

Fire Implications in restoration ecology – FIRE

319,500 €

10. Tahvonen, Olli

Economic-ecological interactions in sustainable use of forest resources

160,000 €

11. Von Weissenberg, Kim

Interbiotic processes between genetically modified trees, forest pests and fungi:
Development of risk assessment procedure
270,000 €

Agriculture & Reindeer

1. Hilden, Mikael

Future alternatives of Finnish agriculture: Dimensions and scales of sustainability
(SUSAGFU)
436,342 €

2. Vilkki, Johanna

Molecular genetic characterization of cattle and sheep genetic resources for
maintaining future animal breeding options
178,800 €

3. Heikkinen, Olavi

Modelling spatial interaction and conflict between reindeer management and other
use of natural resources
339,343 €

4. Marja-Liisa Sutinen

The effects of reindeer husbandry and nature conservation on the strict nature
reserve Malla
65,425 €

Environmental research

1. Hämeri, Kaarle - Kanerva, Pekka - Kulmala, Markku - Pehkonen, Aarne

Emissions from thermal insulations
138,536 €

2. Neubauer, Peter – Salkinoja-Salonen, Mirja

Rapid monitors of the decontamination potential of microbial population in
industrial and environmental habitats
307,900 €

3. Rekolainen, Seppo

Analysis of nutrient cycles in ecological and socio-economic systems for policy
purposes
404,290 €

4. Melanen, Matti

Life cycle approach to sustainable waste management – A case study on newspaper
404,627 €

Green chemistry & Herbal medicine

1. Fagerstedt, Kurt – Ritschkoff, Anne-Christine – Saranpää, Pekka
The effect of modification and natural variation of lignin on wood properties and sustainable use of Norway spruce
209,900 €

2. Hartonen, Kari
Utilization of high temperature water in purification, reactions and processing
320,000 €

3. Niinimäki, Jouko
Use of tall oil for wood log and timber protection
370,770 €

4. Richard, Peter - Penttilä, Merja
Metabolic engineering for pentose utilization pathways in yeast for the production on fuels and chemicals from renewable resource
244,595 €

5. Hohtola, Anja
Natural product formation by plants: enhancement, analysis, processing and testing
418,165 €

6. Julkunen-Tiitto, Riitta
Herbal medicine production: Breeding and cultivation of *Salicaceae* species as raw material in herbal product industry.
302,350 €

Water & Fish

1. Hellsten, Seppo
Sustainable regulation of large watercourses: principles, indicators and methods (PRIMEREG)
273,403 €

2. Karjalainen, Juha
INSURE: Interlocked sustainable use of parallel fish resources
295,220 €

3. Valtonen, Tellervo
Sustainable production of healthy fish in Finnish fish farms: problems at the turn of the millennium
272,000 €

Annex 6

SUNARE Research Programme evaluation form

A summary technical report will be compiled based on the questionnaire.

NOTE well that all forms will be sent also to the evaluation panel members.

A. Description of the project

1) The organisation and structure of the project

Project title (and home page in the Internet, if applicable):

Consortium (if appropriate):

Person(s) in charge:

Name, Institution and position	Gender	Degree	Year of birth
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(COPY NEXT SECTION WHEN NEEDED)

Research staff financed (fully/partly) by Sunare funds

Name, department and position	Person months	Gender	Degree	Year of birth
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Name, department and position	Person months	Gender	Degree	Year of birth
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In the section 'Position' the following titles should be used: professor, senior researcher, post Doc, PhD student/MSc student.

2) The degrees completed in the project

Including all degrees

(COPY THIS SECTION WHEN NEEDED)

Name:

Basic degree:

Sex:

Year of earning the above degree:

Major subject:

University and department (of basic degree):

Degree completed within **this project**:

University:

Department:

Year:

Major subject:

Graduate school (if appropriate):

3) The funding

Total Sunare funding (Euro) and who financed the project¹:

a) Funding from the Academy of Finland, Tekes or Ministry of Agriculture and Forestry

b) Other funding (and the name of the financier)

Other funding for the project:

a) Funding of the home institution (an estimate, including in-kind contribution²) (Euro)

b) Other external funding (Euro):

² Indicate the amount used and also separately the amount **not** used, if any. The final saldo report can be sent later.

² 'In-kind contribution' means an estimate of the monetary value of resources given in other form than money, for example, working time of the personnel.

4) The progress of the project and main results

Please describe the main scientific results and achievements, including the innovativeness (novelty) in comparison to other research in your field. A brief summary of the project progress. How did interdisciplinarity become concrete? (Max 2 pages)

5) What, if any, changes were made to the original research plan?

How did the project follow the research plan and why the plan had to be changed? (Max 1 page)

6) Drawbacks

What factors, if any, hindered the planned progress of the project? Were the risks identified in the beginning of the project? (Max 1 page)

7) The national and international networking of the personnel and area of research

Free text describing your networking. (Max 1 page)

The following forms should be used in describing any activities you feel relevant in the networking of the researchers. 'Other activities' can include things like a work group or an evaluation task, etc.

(COPY THIS SECTION WHEN NEEDED)

Seminar/congress

Title:

Organiser(s):

Time:

Participant(s) from the project:

Activity authors and title (paper, poster, chairmanship, other):

Place:

COPY THIS SECTION WHEN NEEDED

National or international visits longer than 2 weeks

Type of visit (visiting researcher, teacher, etc):

Host:

Time:

Participant(s) from the project:

COPY THIS SECTION WHEN NEEDED

Other activity

Type of activity:

Activity:

Place:

Participant(s) from the project:

8) The post graduate training of the personnel

What training did the researchers receive and who organised it? Were the researchers enrolled in a graduate school?

Researcher

Name of graduate school

Postal address of school

9) How did the project promote equality?

(Max 1 paragraph)

B. Self-evaluation

1) The applicability of the research results

How do the results contribute to practice and decision making? How did/does the project communicate with the end users? How does/did the project disseminate the results? (Max 1 page)

2) How did the Sunare programme work as a whole compared to the goals set for the programme?

The goals of Sunare were

Scientific:

- *To develop the interdisciplinary research of the sustainable use of natural resources*
- *To create new national and international research contacts*
- *To promote researcher training in the field*

And societal:

- *To promote the transmitting of research results from its producers to its end- users*
- *To improve and diversify the sustainable management and use of renewable natural resources.*
- *To improve decision-making concerning the sustainable use of natural resources*

a) On programme level

How did the co-ordination manage its task in trying to achieve the goals? Were the goals relevant and achievable?

b) On project level

Was the funding sufficient compared to the research plan? Did the project receive the funding that was applied for? Would the project have required more support from the co-ordination or from some other agency? Which? Was the steering group of the project helpful and how? (Max 1 pages)

3) Did the research field gain any added value for having a programme compared to normal research grants?

Did the programme enhance the development of the research area? (Max 1 paragraph)

4) What are the future possibilities and plans of the research area and the team after Sunare?

On terms of funding, completion of studies, employment of the personnel, etc. Did any new important research topics rise up? (Max 1 page)

Appendices:

1. A full list of publications and other outcomes of the project

*Indicate only publications bearing an indication of funding granted by the Academy of Finland, Ministry of Agriculture and Forestry or Tekes **for this project.***

Articles:

1. Scientific articles (reviewed) and impact factors for journals
2. Other scientific articles
3. Popular articles
4. Submitted manuscripts (indicate status: submitted/accepted).

Scientific reports

Books or book chapters

Academic theses

Patents

Television and radio programmes

Scientific awards

Other professional documented activities

2. A list and one offprint or paper copy of key published scientific papers (Max of 10 papers/project).
3. One copy of PhD theses, or supervisor's assessment and schedule of the completion of each of the Sunare funded PhD student (in English)
4. The saldo report of the use of funds (from administration). This part can be sent by June 30, 2004.

Please fill in one form in English for each Sunare project (i.e. parts of consortia independently) and send the form as a mail attachment in MS Word format to coordination office, **by May 14th**, except the saldo report by June 30. Mail address is Anneli.Jalkanen@helsinki.fi or Anneli.Jalkanen@iki.fi. Appendices should be sent to coordinator Anneli Jalkanen, University of Helsinki, Department of Forest Ecology, Box 24, 00014 University of Helsinki.

If you have questions concerning filling in this form or about the attachments, do not hesitate to ask. Thanks for your time.

In 2000, the Academy of Finland established the Research Programme on Sustainable Use of Natural Resources (SUNARE) to support and encourage high-quality research related to the sustainable use of natural resources in the natural and social sciences, economics and technology. The programme aimed at supporting research on the use of natural resources from the perspective of a living and productive ecosystem.

SUNARE was carried out over a period of three years (2001-2004). This report by an international evaluation panel presents the findings and recommendations of the evaluation of the research programme. It also includes recommendations for future research programmes.

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