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Evaluation report 2004

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# **Evaluation of Skogforsk's Framework Programme 2001–2004**

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# Preface

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Formas shall promote outstanding research for sustainable development in the areas of environment, agricultural and forestry sciences and spatial planning. The research supported shall meet high demands for scientific quality and, where applicable, be relevant for the sectors of society concerned. The council shall also provide an impetus in initiating research that promotes economic growth in the sectors affected.

Forests and forestry are of great importance to the Swedish economy, for the wellbeing of the Swedish population, biodiversity and the carbon balance of the country. The main product of forestry, renewable wood, is an attractive raw material from the standpoint of sustainability. Today, Swedish forestry has two well-formulated goals for its work – the production goal and the environmental goal, with an equal weight in policy terms. Forestry has an annual export value of 110 BSEK and give work to about 200 000 people, many in rural areas. At the same time, forests are of great importance for a multitude of functions for all citizens. Research and education are important factors for a continued strong position of the Swedish forest sector nationally and internationally.



Lisa Sennerby Forsse  
Secretary General  
Formas

Besides open calls for research applications, Formas also funds strategic research programmes in important areas. Under the spending budget of the Ministry of Agriculture, about 50 MSEK annually is allocated for research co-funded with the business sector. In the field of forestry and forest research Formas has a 4-year agreement for the years 2001 – 2004 with the private forest owners and industry to finance equally 50 percent, or 26 MSEK, of the basic work carried out by the Swedish Forestry Research Institute (Skogforsk). Part of Formas responsibility is to initiate and organise scientific evaluations of the research financed by the council. At the end of the previous agreement period 2001 - 2004, Formas and the Forest Sector together decided to evaluate the work at the institute. The purpose of the evaluation was to assess the scientific quality of Skogforsk

research in an international perspective. In addition the relevance of the research for the industry and society was also evaluated. A group of experts from Finland, UK and Sweden formed the evaluation panel.

On behalf of Formas and the Forest Sector we are very grateful to the expert panel chaired by professor Risto Seppälä for their skilful and efficient work in evaluating a wide variety of activities in forest research and development. Their findings and recommendations to both Skogforsk, and Formas and the Forest Sector are highly appreciated.

Lisa Sennerby Forsse  
Secretary General  
Formas

Sven Lundell  
Forest Director  
Forest Industries and  
Federation of  
Forest Owners  
(LRF Skogsägarna)

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# Executive Summary

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Sweden's forests are amongst the country's most valuable assets, making important contributions to the country's prosperity and welfare. Applied research and development are required to ensure that production and environmental benefits are met and that sustainable forest management is achieved. Forestry policies need to be underpinned by sound, high quality science. Skogforsk is facing a major part of these needs, and an Expert Panel was convened during 2004 to evaluate Skogforsk's performance during the first three years (2001-2003) of the current Framework Programme.

Many of the Expert Panels' conclusions relate to Skogforsk and its research as a whole, rather than to the Framework Programme alone. The main emphasis of the evaluation has been on the scientific quality and relevance of Skogforsk's research and development activities. This report presents the Expert Panel's analyses, views, conclusions and recommendations.

Skogforsk is somewhat smaller than equivalent organisations in many other European countries. Its ownership, funding arrangements and remit are rather unique. Skogforsk is a cost-efficient and well-managed organisation having a competent leadership and motivated personnel. It has a visible international position and is a leading actor on the Nordic and EU arena in a number of its activities. Skogforsk's relative small size and restricted remit make its good international reputation all the more impressive.

The Expert Panel has looked in detail at Skogforsk's publication record. It is clear from this analysis that in general the organisation's own publication targets are met, or even exceeded in some areas. The Expert Panel felt that as web-based publication continues to grow there could be room for rationalization in in-house publication activities. The Panel's overall conclusion is that SkogForsk has a positive, creative and up-to-date approach to communications.

Research and development is undertaken in three research areas (Area 1: Regeneration Material, Area 2: Forest Management and Area 3: Raw-Material Utilisation & Production Systems). For each area specific recommendations are made for consideration in the next Framework Programme. As an overall comment on all three areas the Expert Panel felt that the objectives of the current Framework Programme are being met to a high standard and that research and development are organised well with the appropriate collaborations and level of achievement. Work is generally of good international quality and is making a significant difference to the forest sector in Sweden.

#### **Regeneration Material**

For Area 1, the formation of the new School of Quantitative and Molecular Genetics is a creative and very positive step. It is important that the medium and long-term benefits from a highly regarded field-based breeding programme are not lost. The Expert Panel felt that for the period of the next Framework Programme effort might be directed to delivery of the gains produced to productivity to date and to maintaining the breeding populations. For future Framework Programmes it is recommended that there should be a return to an active breeding programme which certainly has much more to offer.

#### **Forest Management**

With regard to Area 2, the linked issues of climate change and the conservation of biodiversity will be of major significance into the foreseeable future. The Expert Panel felt that a small amount of effort on hardwood forestry should be maintained and linked with the use of forests by the public. The international and national context will place an increasing priority on the conservation and forest protection programmes. The Panel is of the view that there is also a clear need to continue the development work in forest management and planning areas including identification of further cost reductions for all forest operations. This means that fulfilling the environmental and conservation requirements must be done in the most cost-effective way.

#### **Raw Material Utilisation & Production Systems**

In Area 3, high quality work has been done on different parts of the wood supply chain but optimising the chain, as a whole will be a key issue also in the future. The Area has given a substantial contribution to the enhancement of cost-effectiveness in forest operations and to the improvement of the value of wood in the supply chain from forest to mill. It has also done much good R&D work on ergonomics and the use of environmentally friendly techniques. The Area should, however, consider paying more attention to the multiple-use aspects together with Area 2, while trying to maximize the value chain. Furthermore, Area 3

would have an opportunity to improve its international scientific visibility by having more emphasis on publishing in international journals.

The Panel made two empirical surveys connected with relevance and dissemination. Results based on questionnaires showed that the Board, Advisory Groups (to each research area) and field personnel consider that it is good and cost-effective that Skogforsk carries out research and development for a united Swedish forestry sector. An overwhelming majority of questionnaire respondents felt that Skogforsk's activities are relevant and that stakeholders can influence the content and direction of work. The forestry sector appreciates Skogforsk's work, and forestry professionals are interested and involved in Skogforsk's activities. Forest excursions help people to adopt research results, and Skogforsk's conferences and courses are successful and cost-effective. Skogforsk has maintained its leading position in extension work during the current Framework Programme, and the Expert Panel recommends that co-operation with the forestry sector should be further developed in order to move research findings into practical use.

Skogforsk and its research have a clear impact on the Swedish forestry sector, and therefore, it is an indispensable organisation for the country. The Panel is strongly of the view that investment in sound, high-quality and near market research, as provided by Skogforsk, is a good investment in the future. The financial structure (c. 50 % Government, c. 50 % private) of the Framework Programme is optimal for Skogforsk's mission. Government and the forestry sector, and thus the Swedish public receive good value for money. However, if the share of government funding decreases considerably the scientific quality can be in danger.

The Expert Panel made nine main recommendations (See chapter Conclusions and Recommendations) and of these greatest emphasis should be placed on the following:

The Formas funding is very much the core and allows Skogforsk some independence, credibility and authority as a scientific organisation. The Expert Panel thus recommends that:

**Ministry/Formas funding for Skogforsk should be maintained and if possible lifted in line with the intentions stated at the start of the current Framework Programme.**

The Expert Panel felt that a rebalance in Skogforsk's mission in favour of non-market benefits (e.g. amenity, landscape, recreation, environmental and biodiversity benefits) might, in the long run, help to maintain the c. 50 percent public investment in the Framework Programme and recommends that:

**The non-market and quality of life benefits of forestry should be given more emphasis in SkogForsk's programmes.**

Overall the scientific quality of Skogforsk's research is high taking into consideration Skogforsk's strong orientation to applied research. The number of peer-reviewed publications has increased during the current Framework Programme but there is still potential to publish more in international journals. Thus:

**Publication targets for peer-reviewed articles need to be reconsidered and may need to be increased for some research areas.**

The number of publications in some of Skogforsk's own series has been rather low. Therefore:

**Skogforsk should consider decreasing the number of its different publication series by combining those, which publish only few volumes annually.**

The organisation has a high success rate in external funding bids both nationally and to the EU. The current mix (mostly applied work combined with some basic research orientation) is good, but there could be dangers if this was altered so that medium-term and more strategic research were lost. Consequently:

**An appropriate balance needs to be maintained between applied work and medium-term, strategic research, including some basic research.**

Skogforsk's research and development activities are well aligned with stakeholder demand. Dissemination work and the website are very good. In order to get its findings into practical use as fast as possible.

**Skogforsk should increase co-operation with the forestry sector and try to establish formal structures for marketing R&D results to the sector.**



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# Evaluation Process

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## Objectives

The principal objective was to evaluate Skogforsk's performance during the first three years (2001-2003) of the current four-year Framework Programme (FP). According to the agreement between Formas and Skogforsk, the main emphasis in the evaluation was in the scientific quality and relevance of the R&D activities. Skogforsk's overall mission and research strategy were not supposed to be a matter of in-depth consideration.

The objectives and terms of reference are described in more detail in Appendix 1 Guidelines for the Evaluation.

## Expert Panel

The Expert Panel consisted of:

*Professor Risto Seppälä*, Director of Research, the Finnish Forest Research Institute, Metla, Finland (chair).

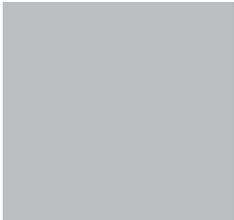
*Dr Peter Freer Smith*, Acting Chief Executive, Forestry Commission, UK.

*Lic Marie Larsson-Stern*, Head of District, Sveaskog, Sweden.

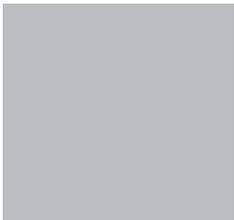
*Jan Orke*, Head of Region, Mellanskog, Sweden.



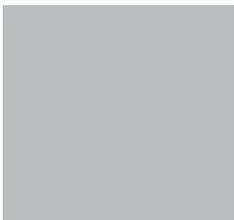
**Professor Risto Seppälä**



**Dr Peter Freer Smith**



**Lic Marie Larsson-Stern**



**Jan Orke**

## Procedures

The Panel met for its initial discussions on 10<sup>th</sup> February 2004 agreeing its terms of reference and modus operandi with Formas and with Skogforsk's Managing Director Jan Fryk. On the 16<sup>th</sup> and 17<sup>th</sup> March 2004 the Panel undertook detailed discussion with Jan Fryk, each of Skogforsk's three Research Directors, Per Ståhl, Kaj Rosén and Lennart Rådström, the Director of Communications, Sverker Johansson, and the 12 Skogforsk's Programme Leaders as listed below:

### Regeneration Material

Bengt Andersson	P1 – Tree improvement: northern Sweden
Curt Almqvist	P2 – Tree improvement: Scots pine, southern Sweden
Bo Karlsson	P3 – Tree improvement: Norway spruce and other species, southern Sweden
Lars-Göran Sundblad	P4 – Seed & seedlings

### Forest Management

Dan Glöde	P5 – Silviculture & forestry planning
Martin Werner	P6 – Hardwood forestry
Jan Weslien	P7 – Conservation & forest protection
Lars Högbom	P8 – Forestry and the environment

### Raw-Material Utilization & Production Systems

Lars Wilhelmsson	P9 – Market requirements & raw-material utilisation
Gert Andersson	P10 – Logistics & IT support
Magnus Thor	P11 – Operation system
Åke Thorsén	P12 – Organisational development

The Expert Panel had a final one-day meeting on 23<sup>rd</sup> April 2004 when the members worked through this report and draw their conclusions and recommendations.

In addition to meeting three times at Skogforsk and interviewing Skogforsk's Directors and Programme Leaders, the Panel (members Marie Larsson-Stern and Jan Orke) carried out two surveys using questionnaires. One set of questions was sent to the members of Skogforsk's Managing Board and Advisory Groups, and another set to staff members in different field organizations of forestry. The analysis on relevance and dissemination is partly based on the results of these surveys.



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# Overview of Skogforsk

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## Background

Sweden's forests are one of the country's most valuable assets, making important contributions to the country's prosperity and welfare. Forests offer a sustainable source of wood-based products, they provide major social, amenity, aesthetic and landscape benefits, and are vital to biological conservation and ecological processes both nationally and globally.

The multiple benefits of forestry cannot be provided sustainably without effective research. Applied research and development are required to ensure that production and environmental benefits are met and that sustainable forest management is achieved. National forestry policies need to be underpinned by sound, high quality science. Research and scientific services are required to meet the undertakings made in international agreements in respect of sustainability, conservation of biodiversity and EU regulations. In Sweden applied research and development are essential to maintain the profitability of the forestry sector which is dependent on its ability to compel successfully with ever-hardening global competition.

Most, perhaps all, developed countries meet their needs for forestry research through a combination of national research institutes and university funding. Skogforsk was founded from two organisations (Skogsarbeten and Skogsförbättring) in 1992 jointly by forest owners' associations and the major industrial forest enterprises as a private institute. Membership has grown and there are now more than 100 members who represent the vast majority of forest enterprises and forestry sector associated businesses.

Skogforsk employs about 110 staff of which c. 70 are scientists, based at four locations: Uppsala (Head Office), Ekebo, Brunsberg and Sävar. Skogforsk has a Managing Director, and three Research Directors who lead the activities of three principal areas. Each of these areas is, in turn, divided into four research

programmes. A Management Board of 11 persons represents the Swedish forestry, the forest industry and the Swedish government. In addition, all research areas have Advisory Groups consisting of 12 to 15 people.

Skogforsk is financed jointly by the Swedish government (via Formas) and by the forestry sector (via members' contributions etc) as well as by external grants (EU etc). The funding of applied forestry research by public-private partnerships has a long history in Sweden.

A large proportion of Skogforsk's work is undertaken in collaboration with its members and with other partners. There is cooperation with the Swedish universities and with other organisations in Sweden and internationally.

## **Mission and Vision**

### **Mission**

Skogforsk's mission is to furnish the forestry sector in Sweden with the knowledge and products that will contribute towards

- profitable and ecologically sustainable multiple-use forestry,
- an internationally competitive forest products industry and
- the prosperity of the country as a whole

### **Vision**

Skogforsk's vision is to be the central driving force behind forestry developments in Sweden and thus an indispensable asset to both the forestry sector and the country as a whole.

## **Comparison with other National Forest/ Forestry Research Institutes**

Funding arrangements and organisational status varies somewhat but the Finnish Forest Research Institute (METLA), the Norwegian Forest Research Institute (Skogforsk), l'Institut national de la recherche agronomiques (INRA), Forestry Division in France, the Swiss Federal Institute for Forest, Snow and Landscape Research (WSL) in Switzerland and Forest Research in the UK are at least partly comparable organisations with Sweden's Skogforsk.



The table 1 below shows some basic data for Britain (Forest Research), Norway (Skogforsk), Finland (METLA) and Sweden (Skogforsk). A straightforward interpretation of these data shows that Sweden's Skogforsk is small in staff numbers relative to Britain and Finland. Clearly there are specific explanations for this relating to different remits and the extent to which basic research, development, statutory and regulatory work are undertaken in each country. Indeed it would appear that Skogforsk (Sweden) has a more restricted remit with work like the National Forest Inventory, Tree Health work the European and Mediterranean Plant Protection Organization (EPPO) and the EU/UNUCE Monitoring of Forest Condition (Level 1 and Level 2 under the new regulation) provided by other organisations in Sweden. It may be relevant that such work is regarded as synergistic to good applied forestry research in many other countries. In all countries listed here the universities focus more on basic ("blue sky") research and on innovation ("cutting edge").

Country	Forest area M ha and % of land area (from FAO statistics)	Name of Institute	Number of staff
Britain	2.8 M ha (12%)	Forest Research	270
Norway	8.9 M ha (29%)	Skogforsk	100
Finland	21.9 M ha (72%)	Finnish Forest Research Institute	800
Sweden	27.1 M ha (66%)	Skogforsk	110

Country	Funding, % from Government	Comments on remit etc.
Britain	c. 90%	Basic and applied forestry research, includes National Forest Inventory, statutory and regulatory work
Norway	c. 80%	Applied forestry research
Finland	> 90%	Mainly applied, includes some basic research and National Forest Inventory, forest statistics, statutory and regulatory work
Sweden		Mainly applied forestry research
total	c. 40%	
FP	50%	

*Table 1. Comparison of SkogForsk with some other national forest research institutes*



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# Evaluation

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## Introduction

The principal, high level focus of Skogforsk's activities is determined in Framework Programmes (FP) of four year duration. These are drafted by Skogforsk in discussion with its members, Board, Advisory Groups and other stakeholders and agreed with Formas. Framework Programmes are subject to external review during their final year and the evaluation is considered in drawing up the next FP. The current FP runs from 2001 to 2004 and is provided in Appendix 2. The research was originally described under four headings:

- Regeneration Material for Growth, Quality and Diversity
- Forest Management for Production and Environmental Care
- Utilising Raw Materials for Increased Conversion Value
- Efficient and Environmentally Sound Operation Systems.

Work is currently being undertaken in three areas:

- Regeneration Material
- Forest Management
- Raw-Material Utilization & Production Systems.

In the following, fulfilling of the stated objectives as well as scientific quality and publications are evaluated by the current three research areas. Relevance and dissemination are mainly reviewed at the level of the whole organization. Finally, measures taken after the previous evaluation are briefly described.

## Publications

The Expert Panel has looked at the record of publications by type over the last five years (see Appendix 3). It is clear from this analysis that the organisation's own targets are mainly met or even exceeded in some cases. The Panel has also looked at publications by research area and, as would be expected, there is considerable variability of publication numbers and target science journals across the three research areas, and some specific comments are made below. Only one type of publication has been terminated over the last five years, and the Expert Panel thinks that as web-based publication continues to grow in importance, there could be room for further

rationalisation (reduction) in the number of publication series. In all, the Panel felt that Skogforsk has a positive, creative and up-to-date approach to communications including publications.



## **Fulfilling the stated objectives of the FP 2001–2004**

### **Area 1: Regeneration Material**

This area of work has employed a traditional plant breeding approaches (selection of plus trees, progeny testing and the establishment of orchards to provide improved seed) for a range of species (Scots pine, Spruce, larch, lodgepole pine, Douglas fir, birch and hybrid aspen). For the main species (pine and spruce) a multiple population breeding strategy is in place, which reflects the different needs up and down the latitudinal gradient of Sweden (62 to 68 north). A less intensive multipopulation breeding system is also run for birch. For the minor species work is restricted to the maintenance of a breeding population. For pine and spruce the programmes are in their second phase (generation of selection) and a third batch of seed orchards is currently being established with forest industry support. These orchards offer 20 to 25 percent gain in productivity (volume increment) and will be able to provide all seed of these species needed for the total seedling production in the country. This is a very significant achievement.

The potential gain from controlled crosses of spruce is as great as 30 percent. Thus there is naturally an interest and good progress with work on somatic embryogenesis and clonal forestry. These are substantial achievements and it is impossible to overstate the importance of this work to Swedish forestry. The work is renowned internationally as a centre of excellence and there are considerable further gains in volume production of timber (and other traits) to be offered by the programmes.

In this area collaboration with the universities is good. The scientific level of the tree improvement programme has been improved during the current research programme through the number of new researchers on the PhD, docent and professor level. There is established and productive collaboration through EU funded projects (GENIALITY, NUTRIGEN, RESROBS and the European Larch Chain). The formation of new School of Quantitative and Molecular Genetics is acknowledged as a creative and highly positive step and the Panel understands that Skogforsk has been a main driver in the establishment of

this School. This needs to be encouraged and supported. The Panel, while regretting the financial pressures on Skogforsk, felt that the proposed closure of the Brunsberg field station is probably a sensible response to the funding shortfall. The joint role, which Bengt Andersson has in the Swedish University of Agricultural Sciences (SLU) and Skogforsk is a good model; more of this type of arrangement could be good for senior Skogforsk staff. The Expert Panel is very clear that the objectives of the current Framework Programme are being met to a high standard and that this area of work is organised well with the appropriate collaborations and achievement.

## **Area 2: Forest Management**

The Framework Programme sets rather a wide scope of activities for this area. Information is required at the practical level on management measures at each phase of the rotation; e.g. work on shelterwood systems, cost reduction for silviculture operations, forest fertilization and hardwood forestry. And there are also longer-term issues like sustainability of nutrient supply from forest soils (nitrogen deposition, wood ash recycling etc.), life cycle analysis and the conservation, herbivore damage and cultural issues. There are close contacts with Swedish forestry companies and the Area has managed to promulgate scientific knowledge in the form of a knowledge based IT-system for advice and guidance to small forest owners.

There has been increasing work to evaluate environmental impacts. In the current Framework Programme knowledge has been provided on the effects of the harvesting of biofuels (tree biomass) and cycling of wood ash. The results address both tree growth and environmental effects of wood ash application. There has been an extensive evaluation of the environmental effects of practical nitrogen fertilization on forests. This analysis will be important background material for a potential increase in nitrogen fertilization in order to increase tree growth without adverse effects to the environment. We (forest science) are now knowledgeable about the effects of fertilization and post-harvest nutrient flushes, but the new EU Water Framework Directive has implications for continuing work in this area.

There is a clear understanding by the Skogforsk scientists working on this research area of the desirability of providing the timber production, nature conservation (biodiversity), social and cultural benefits available from properly managed forest systems.

Skogforsk initiated a committee "Climate and the Forest" at the Royal Academy of Agriculture and Forestry and has produced an extensive literature review on this subject. The tree breeders have also considered climate change. However, little has been done on the practical implications of climate change to Swedish forestry. The Panel was not shown maps of predicted climate for Sweden based on IPCC scenarios but these are available from SWECLIM. If such predictions are examined it is very probable that that clear implications for tree species choice, genotype selection within species, forest protection from insect pests and for forest operations would be apparent. The Expert Panel felt that this area requires comprehensive consideration in the next Framework Programme and that this work would need to be in collaboration with the Swedish University of Agricultural Sciences (SLU), other Swedish universities and other work in the Nordic countries (which should include Scotland!).

The publication list for this area makes it clear that this range of requirements is being met. Publication targets are being exceeded in all programmes. Scientific knowledge has also been made more widely available from across the research area as a knowledge-based IT system for advice and guidance to small forest owners on the website (Kunskap Direkt).

The joint Government and industry funding is important because it provides the basis for looking beyond the immediate needs of the industry. This is particularly important in the environmental and conservation area. Sustainability and conservation issues often need to be balanced against production needs.

The initiation, submission and continued championing and development of the EU FP 6 proposal EFORWOOD as a joint Skogforsk effort led by the Research Director of Area 2 are very significant achievements. The Expert Panel is highly supportive of this approach and recommends the continued support for such co-ordination and leadership roles from senior Skogforsk staff. Similarly where commercial opportunities exist as for Seeds Research, they should continue to be encouraged.

The Panel understands that Programme 5 (Silviculture & Forest Planning) will merge to include Plant Production and Broad-leaved Silviculture in the new Framework Programme. This will create a larger programme and should give good integration across closely related areas, e.g. the best use of broadleaves as a

landscape component in a predominantly coniferous forest estate. It appears to have been difficult to persuade Swedish forestry of the importance of broadleaved woodlands and of hardwood components in mainly coniferous stands. However hardwood forests are valuable in the context of public use of forests in southern Sweden and it is suggested that, since this is already small, this element of Skogforsk's overall programme should not be further reduced in the next Framework period. Involvement in the new EU COST action on quality hardwoods (E42) is an excellent step and should be encouraged.

As the demands of society have developed in Europe, there has been a shift in the ethos of forestry away from a focus on timber production, to embrace sustainable forest management and the delivery of social and environmental benefits. Biodiversity is a key component of sustainable land management and there is a number of international processes (e.g. 1992 Convention on Biological Diversity which arose from the Rio Earth Summit, the EU Habitats and Species Directive and the 1993 Helsinki Agreement by Forestry Ministers). The Expert Panel understands that much of this is enshrined in Swedish Forest Law, which places a joint responsibility for production and conservation of biodiversity. During the current Framework Programme new knowledge has been published on how effective the different measures are for the protection of biodiversity. The results bring forward new knowledge on the living conditions for “red listed species” and give hope for more cost-effective approaches to nature conservation in forestry. Although the international and national context will place an increasing priority on the conservation and forest protection programmes, there is also need to continue the development in the forest management area, such as silvicultural methods and forestry planning, and find ways to further reduce costs of all forest operations.

### **Area 3: Raw-Material Utilization & Production Systems**

Research Area 3 is mainly dealing with problems of timber harvesting and transportation aiming at enhancing cost-effectiveness in forest operations, and with problems of wood properties aiming at improving the quality of the raw material in the wood supply chain from forest to mill. The Area has also a small programme on organizational development with a special emphasis on contractors and middle management in forestry. The overall goal of Area 3 is to contribute to maximizing the value obtained from the timber.



In all, Area 3 has fulfilled and in some cases already exceeded many of the objectives of FP 2001-2004. Examples of major achievements so far are models explaining fibre and other wood properties, identification of alternative scenarios for harvesting systems, contribution to the development of protection and ergonomics systems for people working at the logging site, and a study on middle managers revealing the great potential they have in the development work. Furthermore, the Area is the hub of both National Road Data Base and Standard for Forest Data and Communication. It has also developed a vision of logistics 2010 to serve as a backbone for its efforts to improve the wood supply system.

The Programmes in Area 3 seem to have much cooperation with other organizations working in the same fields. The Area has coordinated the EU project PROMOTE and has participated intensively in EUROFIBRE. There are, however, still possibilities to intensify networking and collaboration both in Sweden and abroad, especially with researchers who represent expertise and disciplines that are needed but in which recruitment is not possible for Skogforsk because of financial or other restrictions.

While the overriding goal of Area 3 is to achieve greater efficiency in forest operations and optimize the value obtained from wood, this must be done with a minimal negative impact on people and environment. Area 3 has indeed carried out much high quality R&D work on ergonomics as well as techniques and methods aiming e.g. at a soft foot print, low exhaust emissions and the use of environmentally friendly fuels. The Panel considers this work necessary and very valuable but at the same, it wants to remind about multiple-use aspects, such as income from recreation and nature tourism, which can in the future in some regions exceed the economic value now provided by the timber. The multiple-use forestry is even mentioned in Skogforsk's mission statement. Although in the current FP Area 2 is addressing it, Area 3 might also take multiple benefits into account when trying to enhance cost-effectiveness in forest operations.

Except the project on organizational development, the work in Area 3 falls to a great extent to the traditional forest and wood technology research. Within this frame it covers most of the key issues of wood harvesting and raw-material utilization. In some of its research fields, Area 3 can be considered globally as one of the leading actors.

A holistic view for the entire wood supply system is emphasized in the strategic documents of Area 3. Publications and presentations made to the Panel gave, however, a slightly fragmented impression. This may not be the case in reality but there is always a danger of sub-optimizing. It is clear that limited resources force to focus on those parts of the wood supply chain that give most value for money but the holistic view including enough emphasis on roundwood markets and long-term demand for wood should be one of the main goals also in the next FP.

## Scientific Quality

### Area 1: Regeneration Material

High quality presentations were made to the Expert Panel by the Research Director and four Programme Leaders for this area. Publication rates are high, exceeding the organisation's targets by a considerable margin. The Expert Panel noted the production of both peer-reviewed scientific papers in conference proceedings, technical reports and popular articles. Peer-reviewed scientific papers are in the top-rated international tree genetics journals. There is a greater component of fundamental science in this research area, which has implications for the publication record. This research area is thus to be congratulated on a very significant achievement during the current Framework Programme. The Expert Panel considers the work of this area to be of the highest international quality, comparable with the best of North American tree breeding programmes (where investment is considerable), making a significant difference to the forestry sector of Sweden.



It would be unsatisfactory if the funding to areas and programmes was re-structured in the next Framework Programme in a way which prevented the benefits derived from selection and breeding work to-date from being realised. In particular, the planned reduction of the breeding programmes down from three to two and associated loss of funding could significantly restrict the potential for further improvement of productivity and timber quality. The breeding programmes are an outstanding feature of Skogforsk's current Framework Programme, and it is important that the medium and long-term benefits from a sound field-based breeding programme are not lost. There is a question over the focus needed on developing further genetic gain or delivery of what has been achieved to date during the next Framework Programme. The Expert Panel felt that for the period of the next Framework Programme effort might be directed to delivery of the gains produced to productivity

to date and maintenance of the breeding populations. For future Framework Programmes it is recommended that there should be a return to an active breeding programme which certainly has much more to offer.

### **Area 2: Forest Management**

International and European contacts are one mechanism for achieving a wider perspective and, as for Area 1, such contacts are also excellent in Area 2. EU partnerships have been valuable and the large degree of involvement reflects the quality of Skogforsk's activities and reputation in both areas. Involvement with the European Forest Institute and the International Union of Forest Research Organizations, (IUFRO) is also strong.



This is an area where experience of both forestry and of wider environmental science is needed. In Area 2 there has been a number of externally funded, time limited and specific projects, which have required competence not normally found in Skogforsk. Thus these projects have been partially staffed by temporary employees with less job security. The Expert Panel admits that hiring people on a temporary basis is a way of achieving flexibility, but because work is likely to be sustained in this area with continued public and policy interest in conservation and forest protection, permanent employment should be offered where possible.

The Panel felt that there is scope for increasing the emphasis on research and advice on practice to conserve biological diversity and also on the implications of climate change on Swedish forestry. These linked issues (climate change and the conservation of biodiversity) will be of very major significance into the foreseeable future. The Panel also felt that the relatively small amount of effort on hardwood forestry should be maintained and linked with the use of forests by the public.

### **Area 3: Raw-Material Utilization & Production Systems**

With regard to the number of publications, Area 3 has reached well its targets. In all, the number of articles in "popular" forums is very satisfactory as well as participation and the number of papers in conferences. However, very little has been published so far in international peer-review journals, although the "pipeline" figures presented by Area for 2004 seem to indicate a considerable increase.

A low publishing activity in referee journals is typical for an application oriented research field, such as Area 3. Because in

most other countries the situation is very similar Skogforsk could see an opportunity to improve its international scientific visibility in some of the research fields represented by Area 3. In the long run, scientifically high-quality research also helps to maintain the quality of applications high. This presupposes, however, that scientific targets are set higher than now and researchers are increasingly encouraged to publish in international peer-review journals.

The Panel understands that the turnover rate of staff has been rather high in Area 3. This is not surprising because a high turnover rate is common in technology-related forestry research in many other countries, too. The situation has perhaps already created problems also for the quality of research, but these problems may become really serious if the foreseeable financial restrictions will force Skogforsk to refrain from hiring new staff to replace those who leave. With regard to recruitments, the technology-related expertise seems to be at a high level but perhaps in the future knowledge on economics, both at micro and macro levels, should be better represented than now.

### **Relevance and Dissemination**

The organisation of Skogforsk with Board members and Advisory Groups from the stakeholders is meant to expose the needs of forestry. Advisory Groups are linked to all three research areas. Each group consists of 12-15 persons representing stakeholders.

The evaluation of relevance and dissemination was made on the basis of three different sources:

- Interviews with the Programme Leaders on relevance, information and dissemination (10 out of 12 Programme Leaders). Information was received also from the Managing Director, the Research Directors and the Director of Communication.
- Two different questionnaires. One was sent to the Managing Board and Advisory Group members (totally 49 persons, 98% response rate), and another to staff members in the field organisations in forestry (totally 94 persons, 81% response rate).
- Evaluations initiated or made earlier by Skogforsk.

## Relevance

The Programme Leaders are of the opinion that Skogforsk in general is dealing with the most relevant research and development areas. However, several of the leaders pointed out the need for increasing activities in the sector of forestry planning. The cooperation with the Advisory Groups is appreciated. The overall opinion is that the Advisory Groups have the possibility to influence and actually influences on the R&D activities, more the closer they are to application.

The questionnaires show that the Board, Advisory Groups and the field personnel have the opinion that it is a good and cost-efficient construction that Skogforsk carries out R&D activities for the united Swedish forestry sector. An overwhelming majority thinks that Skogforsk carries out relevant R&D activities and that the stakeholders influence both the content and direction. A few people had doubts over the relevance of Skogforsk's activities in areas not directly connected to forestry, such as IT and organisation development.

It is obvious that the forestry sector appreciates Skogforsk's work. The high response rate of the questionnaires as well as the positive replies show that forestry professionals in general are very interested and involved in Skogforsk's activities.

Even though the Advisory Groups consists of 12-15 representatives from the forestry sector, some individuals in these groups are said to be dominant and more active and therefore influence the research direction more than others. Skogforsk needs to be aware of this and to take it into account, e.g. to involve all members actively and to ensure that there is appropriate turnover of group membership.

	Skogforsk efforts enough	Forestry sector efforts enough	Co-operation between Skogforsk and the forestry sector
Board and Advisory Group (%)	77	66	85
Field staff (%)	43	54	93

*Table 2. Percentages of Board, Advisory Group Members and field staff who agree that enough effort is made in implementation and have the opinion that further co-operation would increase the implementation.*

The Expert Panel felt that there is potential for work on organisational development of forestry and that the future of this work needs careful consideration. There are several other very good organisations working on organisational development generally, so that if Skogforsk will be involved it needs to concentrate specifically on forestry issues such as the starting up of small forestry contracting business.

The opinion of the Expert Panel is that the overall orientation of Skogforsk's R&D is well aligned with stakeholders' demands. The activities are carried out in a cost-efficient way.

### **Dissemination**

According to the Programme Leaders, the results from different projects often need to be further developed before implementation. This also means that it takes quite a long time before the results are known and implemented in forestry. They even mention that there is a need for Skogforsk to increase the ability to transfer research knowledge into practical use. Forest excursions make people adopt the R&D results in an efficient way. In fact, it would be a good idea to use part of the budget for different projects to ensure that the results will be applied. To increase the interest it would be good to create projects that are involving the forestry staff in different organisations from the very beginning.

According to the answers in the questionnaires Skogforsk is active in producing high qualitative and accessible publications with R&D-results. Close to 100 percent from the respondents said that they had read several Skogforsk publications during the last year. Skogforsk also has a reputation of being a successful organizer of conferences and courses, mostly worth the price. Almost everyone find Skogforsk's R&D results possible to implement, but only 70 percent say that they become implemented. About 50 percent of the field staff thinks that Skogforsk as well as the forestry sector itself make enough effort in the implementation of the R&D results. For the Board and Advisory Group members these figures are higher. An extended cooperation between Skogforsk and the forestry sector would definitely increase the practical use of the research results (see table on the previous page). One reason is probably decreasing number of staff members who in the former organisations translated R&D reports to practical instructions.

About 10 percent of the total budget of Skogforsk is used for information activities. Internal goals and key figures are formulated and followed up for each activity, for example:

- Overall: Cost coverage 50 % (reached)
- Courses: Customer satisfaction 70 %, cost coverage 80 % (reached)
- Web: 150 000 visits/year (reached)
- Media: 500 articles/year (reached)

The evaluations of the information activities made by Skogforsk confirm the positive picture given above.

The Expert Panel states that Skogforsk kept its leading position in the extension field during the FP period. The Panel recommends Skogforsk to develop the cooperation with forestry in the efforts to get the research findings into practical use. We realise that the forestry sector does not take the full responsibility to adopt research results. The Advisory Group members can play a more active part in this process. It would definitely encourage forestry to a higher degree of implementation if more evaluations, such as Elin Eriksson's work, of the economic value of implementing research findings, were made. The work that started up with Sten-Gunnar Skutin's report is interesting and should continue in all research areas. To increase the efficiency in the information activities and contacts with forestry a developed customer data-base would be a good tool. The Panel recommends continuing to popularise scientific knowledge in web-based systems, as in "Kunskap Direkt" – a system for advice and guidance to small forest owners.

### **Measures Taken after the Previous Evaluation**

This summary focuses on opinions, conclusions and recommendations made by the previous Expert Panel in its Report of February 2000. Measures taken or aimed at, based on their recommendations, have been reported by the Skogforsk Managing Director and are indicated in italic.

The total number of scientific publications was somewhat lower than could have been expected. For mostly obvious reasons the numbers varied significantly between R&D areas: high in "Ecological Forest Management" and "Tree Breeding", low in "Operation Systems" and "Work Organisation".

On the other hand, the rate of “popular” publications was generally very high, and reached a great number of receivers in various target groups.

*Since the evaluation, target numbers for scientific as well as popular publications have been introduced for separate R&D areas as well as for individual researchers.*

It was found satisfying that such a large share of Skogforsk's scientific articles was published in well renowned scientific journals.

The group found Skogforsk participation in international conferences to be rather low.

*This was, at least partly, due to the fact that at the time, Skogforsk did not register such participation on a regular basis. However, this is being done since 2001, which also can be seen in the annual reports.*

Skogforsk's strategy for increasing the formal scientific level of research staff was noted with satisfaction, and the number of researchers with a Doctor degree was said to be significant. It was also noted that over all qualifications were high.

*Since 2000 the number of Doctors has increased another 50 percent and has now reached the desired sustainable level.*

Generally, it was found that Skogforsk's R&D held high international standards. However, scientific publications should be more evenly distributed over R&D areas and it should be considered whether publishing in a fewer number of various journals etc. would be preferred.

*Actions taken – see above.*

Skogforsk should introduce a system providing a more accessible overview over researchers' individual competence.

*Has been done.*

The orientation of Skogforsk's R&D was found to be well aligned with stakeholders' demands. A number of suggestions as regards future orientation of R&D and allocation of resources

were made by some interviewed member representatives as well as by the evaluation group.

*Such suggestions were seriously considered in the new FP 2001-2004.*

Skogforsk and its R&D was found to be well known and well anchored in the forestry sector and interviewed persons said that forestry in Sweden surely benefited from Skogforsk's R&D.

The evaluation group expressed the impression that Skogforsk, its Executive Board, management and Advisory Groups, made well-founded decisions as regards the balance between FP-research, project funded research and contract research, in order to maintain high R&D benefits in Swedish forestry.

Skogforsk's extension (publication, articles, courses, conferences, seminars, films, excursion, Internet, etc) and dissemination of research findings and knowledge was said to be a hallmark, and it was stated that Skogforsk had kept its leading position in this field during the FP period.





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# Conclusions and Recommendations

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The Expert Panel has formed some firm conclusions as listed below. However, the Panel found that it was difficult to evaluate the Framework Programme alone as many FP activities are jointly financed with other activities. Thus many of the conclusions relate to the organisation and the research work as a whole whether contract or Framework Programme funded.

The Expert Panel was very clear in its conclusion that Skogforsk fulfils an important role in the Swedish innovation system and is a major national performer of applied forestry R&D. It is an efficient and indispensable organisation for research-based knowledge transfer to the Swedish forestry sector and its research results have had a clear impact on the Swedish forestry. Hence, it contributes to the country's prosperity as a whole.

Skogforsk's very tight links to the Swedish forestry sector as well as the strong support of the sector and the sector's active engagement in Skogforsk are rather unique in forest R&D internationally.

Skogforsk is an attractive and respected partner in national and international (primarily Nordic and EU) forestry R&D. Skogforsk has a visible international position and is a leading actor on the Nordic (and EU) arena in a number of its activity areas. Skogforsk's relative small size and restricted remit make its good international reputation all the more impressive.

Skogforsk is a cost-efficient and well-managed organization having a competent leadership and motivated personnel. It has a high level of academic qualifications for this type of application-oriented organisation, and this competence has improved during the FP period. The number of professorships linked to Swedish universities is also increasing.

Financial structure (50 % government, 50 % private) of the Framework Programme is optimal taking into consideration Skogforsk's mission. The Panel feels that both Government and the forestry sector, and thus the Swedish public as a whole receive good value-for-money. If the share of the government funding decreases considerably (say under 40 %) the scientific quality can be in danger. An over reliance on external funding would result in a risk of Skogforsk being steered away from core areas, and in these circumstances the opportunity to maintain holistic approaches, integration and synthesis would be reduced.

The part of Skogforsk's Framework Programme that has been funded by Formas (on behalf of Ministry of Agriculture) has remained the same during the period of the current programme and has in nominal terms been almost the same since the first FP in 1992/93. The forestry sector's financial contribution to Skogforsk has gone some way to making up the shortfall but the industry is unable/unwilling to continue to do this. This development together with lack of growth in external funding has obviously created significant and unwelcome financial pressures.

The Panel is strongly of the view that investment in sound, high quality and near-market research, as provided by Skogforsk, is a good investment in the future. The Panel understands that the forestry sector members have confirmed their continuing willingness to fund Skogforsk according to the agreed formula i.e. to match the Government contribution. The Formas funding is very much the "core" of Skogforsk and allows the institute some independence, credibility and authority as a scientific organisation.

The Panel, while conscious that the view is at the margin of their remit, would nevertheless wish to recommend that

**1) Ministry/Formas funding for Skogforsk should be maintained and if possible lifted in line with the intentions stated at the start of the current Framework Programme.**

Skogforsk's main emphasis is focused very much on forest industry needs although in the mission statement also ecologically sustainable multiple-use has been mentioned. This industry emphasis may currently be appropriate but public investment (by Formas via funding from the Ministry of

Agriculture, Food and Consumer Affairs) should also yield non-market and quality of life benefits. The Expert Panel thus felt that a rebalance in Skogforsk's mission in favour of non-market benefits (e.g. amenity, landscape, recreation, environmental and biodiversity benefits) might, in the long run, help to maintain the c. 50 percent public investment in the Framework Programme. Therefore, the Panel recommends that

**2) The non-market and quality of life benefits of forestry (amenity, landscape, recreation, environmental and conservation of biodiversity) should be given more emphasis in SkogForsk's programmes.**

Clearly it is necessary for Skogforsk to be an effective organisation with internal structures suited to its remit. A benefit from a fewer and larger research programmes is likely to produce a better integration of work and a more holistic approach. However, the Panel would like to question the proposed move from three to two research areas in the next Framework Programme: will the two research area plan really give greater integration of appropriate work and save money compared with the current system of three areas? Therefore

**3) Careful consideration needs to be given to the organisational structure which is associated with the next Framework Programme.**

In all, the scientific quality of Skogforsk's research is at a satisfactory level, and the international scientific publication rate is in many cases comparable with university departments in corresponding fields but varies by Research Areas. The number of peer-reviewed publications has increased during the FP period but there is still potentiality to publish more in international journals. Thus,

**4) Publication targets may need to be reviewed and may need to be increased for some research areas.**

Skogforsk's publication "suite" is varied because it has many different target audiences. However, in some series the number of publications is very low and there may indeed be too many series. Therefore

**5) Skogforsk should consider decreasing the number of its different publication series by combining to other series those series that publish only few volumes annually.**

Taking into consideration the Skogforsk's mission, the amount and quality of basic research is overall at a very satisfactory level. The organisation also has a high success rate in external funding (data were examined for success rates in applications to Formas and there is also a good success rate in applications to the EU). A significant issue is the balance of work between science and development/industry work. These are synergistic – mutually beneficial – and a sensible balance needs to be maintained. The current mix (mostly applied work combined with some basic research orientation) is good, but there could be dangers if this mix was altered so that all medium-term and more strategic research will be lost. Consequently,

**6) An appropriate balance needs to be maintained between applied work and medium-term, strategic research, including some basic research.**

The R&D activities are well aligned with stakeholders demand and the dissemination work gets high marks in all kind of evaluations. For example, the website is very good. However, there is still room for improvement in the dissemination activities. The Customer Relations Management Software (CRM) could be very useful but requires further development. The Expert Panel recommends that

**7) Skogforsk should continue the good work started with the Sten-Gunnar Skutin's study, develop the customer data base for more precise customer relations, and accept that the findings need marketing before they can generate money through conferences and seminars.**

In order to get its findings into practical use as fast as possible

**8) Skogforsk should increase cooperation with the forestry sector and try to establish formal structures for marketing R & D results to the sector.**

This is a responsibility for both Skogforsk and the forestry sector. The Panel also recommends that

**9) The Advisory Groups should play a more active role both in the dissemination of results and in gathering ideas and opinions on SkogForsk's activities.**

In addition, the Expert Panel has some specific recommendations as detailed in chapter 4 of this report Evaluation.

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# Appendices

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Guidelines for the Evaluation

SkogForsk's Framework Programme 2001-2004

Description of Skogforsk's Publications

Data on Publications

Report on Replies to Questionnaires Used to Evaluate Relevance  
and Dissemination

Position Paper (feedback/response from Skogforsk)

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## Appendix 1.

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# Guidelines for the Evaluation

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### **Aim and Terms of Reference:**

According to the agreement between Formas and Skogforsk the “scientific quality” and the “relevance” of the R&D-activities within the present frame-work-programme (FP; 2001-2004) should be examined before the termination of the actual FP-period.

The main target of the evaluation is the R&D-activities during the already passed first three years (2001-2003) of the FP.

The R&D-activities should be evaluated according to the most suitable procedures chosen by the Expert Panel after considering the aspects and questions raised below in the guidelines.

Skogforsk's overall mission and research strategy, as being part of Swedish forest/forestry research, should not be a matter of in-depth consideration.

If the Expert Panel makes important observations on Skogforsk's internal organisation or external interactions with other national and international forestry research bodies, comments on these in the final report will be acknowledged.

International comparisons of Skogforsk's R&D-performance with that of similar research institutes abroad will be appreciated, given that the available timeframe permits such an effort.

### **Expert Panel**

An Expert Panel consisting of scientists as well as stakeholders within forestry will make the evaluation. The scientists should be internationally well-awarded and active within relevant scientific fields. Stakeholder representatives should have central positions in the sector with insight in actual research needs of end-users.

An intended size of the Panel is three-four persons. There should be no doubts as regards the impartiality of the member of the

Panel in relation to Skogforsk. Serious measures should be taken to achieve as equal as possible representation of sexes in the Panel. The scientists should preferably be from outside Sweden. Formas' Secretary General Lisa Sennerby-Forsse takes the formal decisions of the members and chair of the Panel.

#### **The Expert Panel:**

*Professor Risto Seppälä*, Director of Research, the Finnish Forest Research Institute (Metla).

*Dr Peter Freer Smith*, Acting Chief Executive, Forestry Commission, UK.

*Lic Marie Larsson-Stern*, Head of District,, Sveaskog, Sweden.

*Jan Orke*, Head of Region, Mellanskog, Sweden.

### **Evaluation Performance and Indicators**

The detailed performance and choice of tools and indicators should be the responsibility of the Expert Panel.

However, a recommendation is that the status, trends and goals of scientific quality and relevance should be examined with respect to what is presented below. In the examination the applied nature of Skogforsk's R&D-activities should be considered.

#### **Relevance**

Importance, direction and balance of the FP and its R&D-activities in relation to needs in forestry and society (e.g. economical goals, goals in forestry law, the special environmental goals (Swedish "Miljökvalitetsmålen") of interest for forestry etc).

Are Skogforsk's R&D-results implemented in Swedish forestry? The overall question to answer is: what difference does Skogforsk's R&D-results make? Which are the especially important achievements in forestry based on results from Skogforsk? Is the time between research initiation and result implementation sufficiently short? Does invested money yield value to a reasonable extent?

#### **Dissemination**

The dissemination of Skogforsk's R&D-results in Swedish forestry – is it well adapted (content, form, timing) to needs among end-users?

Dissemination competence of Skogforsk – balance, depth, education program?

### **Measures Taken after Previous Evaluation**

An analysis should be made of to which extent Skogforsk has considered and implemented suggestions by previous evaluations, thus improving the R&D-activities.

### **Overall Conclusions**

Is the scientific quality at a sufficiently high level?

Is the present FP well adapted to needs in forestry and society?

Are the R&D-activities in accordance with the FP?

Is it likely that the goals of the present FP will be achieved?

Which are the main recommendations for the next FP? -  
Which especial strength of Skogforsk could be even better utilised, which evident deficiencies ought to be corrected?

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## Appendix 2.

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# Framework Programme 2001-2004

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### Background

Sweden's forests constitute one of the country's most valuable assets. Managed prudently and competently, they can continue to contribute indefinitely to the welfare and prosperity of the country. Being a source of renewable raw materials, the forests offer an unrivalled opportunity for the sustainable production of a host of useful wood-based products. Yet they are also home to a string of social, amenity, aesthetic and other values. Likewise, their importance to the natural environment and ecological balance cannot be overestimated.

Forestry is a cornerstone of the country's economy. Together with the forest products industry, forestry is vital to Sweden's ability both to maintain a positive balance of payments and to prosper as a nation. But the profitability of the forestry sector and, hence, its ability to compete successfully against the ever hardening global competition, cannot be sustained without intensive and carefully targeted research & development.

Applied R & D work is crucial not only to the integration into operational forestry of the production and environmental objectives of the national forestry policy, but also to ensure that the non-timber values of the forests are utilized effectively and responsibly. In addition, R & D is needed to help us meet the undertakings we have made under international agreements in respect of sustainability, safeguarding biodiversity, developing rural areas, etc. We also have a duty to future generations to pursue forest tree improvement both to provide regeneration material for forests containing vigorous, healthy and high-quality trees, and to be prepared for possible climatic and environmental change.

*The R & D work pursued under the Framework Programme must therefore provide the knowledge needed to facilitate the profitable, ecological and sustainable multiple use of the forests and, at the same time, satisfy the diversity of interests involved in the forest landscape to the benefit of both the forestry sector and the community at large.*

## The Nature of the Research

The Framework Programme focuses on applied R & D, based on a holistic and synergetic approach. This calls for an integrated, interdisciplinary procedure and a sufficient breadth to cover all aspects of forestry activity. The aim throughout must be to devise cost-effective solutions that are also easy to implement. The different conditions that exist in large-scale forestry and family-enterprise forestry, and in industrial and non-industrial forest enterprises must all be taken into account. Furthermore, it is necessary to monitor international events and developments influencing the forestry sector, to consider them in the R & D work and, when needed, to participate in such processes.

R & D work requires acute awareness of the needs and priorities of both the forestry sector and society in general. It shall be conducted in close collaboration with both practical forestry and other research organizations. International cooperation is a natural element and should be pursued in those areas of the Framework Programme that are judged to be relevant and beneficial to Swedish forestry and the country as a whole.

The focus on applied research and the sometimes highly complex nature of some of the problems call for competence that has both breadth and depth. Competence must be developed continually and supplemented by analysis of events in the world that could influence the future of forestry. The research methods and tools used must also be constantly improved and adapted to changing needs. Making full use of the opportunities offered by modern IT is fundamental to both research work and information activities.

## The Scope of the Research

The scope of the research under the Framework Programme is described below under four headings: *Regeneration Material for Growth, Quality and Diversity*; *Forest Management for Production and Environmental Care*; *Utilizing Raw Materials for Increased Conversion Value*; *Efficient and Environmentally Sound Operation Systems*. Appropriate organization of the operational research activities will ensure that the necessary integration of work under the different headings is achieved.

### *Regeneration Material for Growth, Quality and Diversity*

The availability of high-quality genetically improved regeneration material that has been optimized for different environ-

mental conditions is of strategic importance to the long-term future of both the forestry sector and the country. Tree improvement is crucial to the creation of future forests with a high productive capacity and wide genetic diversity. This also ties in with the main theme of Sweden's national forestry policy, which states that as a national asset, the forests must be managed for sustainable high yield and the safeguarding of biodiversity.

The overriding goal here is *to pursue, as an integral part of the long-term management of the genetic resources of the relevant tree species, tree breeding for important target traits and readiness for future climatic or environmental change*. Other objectives are to make effective use of the breeding gains and to maintain a suitable level of diversity in the regeneration material.

Thus, tree breeding will continue to be run in accordance with the guidelines drawn up by the Tree Breeding Investigation (1995), i.e., the activities will comprise integrated operational forest-Regeneration material, with the emphasis on Scots pine (*Pinus sylvestris*) and Norway spruce (*Picea abies*), the aim of which will be sustainable breeding and dynamic gene conservation for continued evolution. The programme for sustainable breeding will also include lodge pole pine (*Pinus contorta*) and birch (*Betula* sp.). Intermittent and less extensive breeding work will be done with other relevant broadleaved and coniferous species. As new scientific knowledge is acquired, it shall be applied in breeding policies and strategies.

To ensure that breeding is carried out efficiently and that the results can be readily transferred to the regeneration material for use in operational forestry, existing methods of mass propagation must be improved and new methods developed. Of particular interest here is the development of methods for vegetative propagation, such as the propagation of cuttings, and somatic embryogenesis, for Scots pine and Norway spruce. Research on seed orchards shall mainly be directed at the promotion of early and abundant flowering, and at limiting the effects of background pollination.

R & D work is needed to support the development of improved breeding methods, together with systems and methods for testing and evaluating different traits. Important tasks include identifying which breeding effects influence which traits, improving the accuracy in quantifying these effects, and improving the methodology for early testing. Furthermore, there is a need to increase the knowledge of wood-property

variance and heritability, and of the relationship between diversity and breeding gain.

To achieve regeneration that is both more cost-effective and biologically more reliable, the criteria governing seed handling and seedling production must continually be adapted to newly gained knowledge and new requirements. These new criteria will then serve as a basis for improving the methods and techniques. Research is needed, for instance, to enable the environmentally sound production of homogeneous plant material that is free from injury, with a high survival rate and high vitality.

Given the long-term nature of many of the aforementioned tasks, continuity in the financing of the work is essential.

#### *Forest Management for Production and Environmental Care*

Profitability is a precondition for sustainable forestry and is itself conditional on efficient operations and a sustained high level of timber production. In addition, there is scope for increasing the value of the forest landscape further through multiple-use forestry. These conditions, together with the aspiration to meet ambitious environmental goals and to minimize both the risk of damage by pests and the adverse effects of climate and environment change, demand broad differentiation in the approach to stand establishment and treatment.

An important objective of research under the Framework Programme *is to develop methods of forest management for varying conditions, which, during the different phases of the rotation, secure a sound balance between commercial forest production and environmental care.* Of particular importance in this context are the maintenance and promotion of biodiversity and the protection of forest soil and water. To a high degree, the activities must be interdisciplinary and based on a holistic and synergetic approach. By the very nature of the research, some of the activities will have a long-term timeframe.

In view of the aforementioned, it is extremely important to define the function of the different measures, together with their production, economic and environmental effects. The impact of the measures on biodiversity, soil and water are of particular interest. Thus, essential work will include the development and use of evaluation models (e.g., environmental

impact analysis, EIA, and life-cycle assessment, LCA), which take the special time and space aspects of forestry into account.

Research in the field of silviculture will focus on the development of operational methods for stand establishment and tending of young stands that are environmentally sound and biologically and economically effective, and also on monitoring the long-term effects of such methods. Key activities here include site preparation, direct seeding, planting and natural regeneration, plus cleaning and thinning. Particular emphasis will be placed on preventing attacks by different pests on seedlings and young stands.

Hardwoods are of great value when it comes to maintaining biodiversity and, through leaf fall, several species are also beneficial to the soil. Including broadleaved trees in the forest landscape enhances its aesthetic value. Hardwood timber is also a valuable industrial raw material—one that is predicted to be in short supply on the domestic market for many years to come. Greater knowledge of the importance of hardwoods to the forest ecosystem is needed, so that we can better utilize the different benefits that these trees bring. At the same time, existing methods of hardwood forestry need to be improved and new ones evolved.

The use of appropriate measures for tending stands in order to maintain productive and healthy forests of high quality is vital to society and fundamental to the long-term survival of the forest products industry. It is essential to continually study the effects of soil acidification and nutrient leaching and to pursue research that will provide the information needed to formulate criteria for determining actions that should be taken to counter the adverse aspects of these effects, including the safeguarding of water quality. The same applies to the removal of nutrients from, and addition of nutrients to, different sites. As regards the role of the forests as a sustainable source of energy, it is particularly important to elucidate the effects of recycling wood ash onto forest land, and to draw up guidelines and develop efficient methods as to how this should best be done.

The forest landscape offers many valuable opportunities other than the production of timber. Multiple uses can contribute to the profitability of forestry. At the same time, greater influence and participation from the public as to how the land is used can be expected. Introductory efforts shall therefore be conducted to develop methods for communicating with the

world at large, and for clarifying both the requirements and the level of satisfaction of the general public as regards forests and their use. Ways in which multiple-use forestry can be practised without conflicting with the common-law “Right to roam” and the production and environment goals stipulated under the forestry Act shall also be elucidated.

To enable suitable forest-management options to be chosen, given the natural and other conditions that affect forestry and taking all the various interests into account, there is a need for functional and reliable systems for planning how resources are to be used and which measures should be taken, and for monitoring their effectiveness. During the period covered by the Framework Programme, SkogForsk will therefore be playing an active role in the improvement of existing methods and the development of new ones, with particular emphasis being placed on the special conditions pertaining to family-enterprise forestry. In conjunction with operational and strategic planning for profitable, ecological and sustainable multiple-use forestry, it is also important to monitor the conservation of cultural heritage, i.e., objects and sites of natural, historical or cultural value in the forests.

#### *Utilizing Raw Materials for Increased Conversion Value*

A sustainable supply of raw materials to the forest products industry is conditional on the ability of forestry to generate a surplus for the forest owners that is sufficient to cover the management costs incurred in producing a return on the invested capital. At the same time, the mills are under pressure as regards the price they can afford to pay for the raw material. It is therefore essential *to try to optimize the value that can be obtained from the raw materials, based on market orientation and customer-driven requirements.*

To improve the profitability of forestry and to strengthen the competitiveness of the industry, close integration of the links in the entire chain from forest to market must be achieved. This requires a holistic systems approach, with integration of organization, technology and logistics in the flow orientation of forestry-sector activities.

Better knowledge of the relationships between the end-product requirements and the raw materials is needed to enable assured deliveries of wood with specified and well-defined properties. This, in turn, requires the development of detailed

demand specifications and the capability of determining the wood and fibre properties of the trees in the field or, alternatively, of predicting these on the basis of specific stand characteristics.

To this end, continued R & D is required, in close collaboration with other research organizations, to elucidate the wood and fibre properties of trees and the variation in these between stands, between trees and within individual trees. In addition, work must continue on the development of technical solutions for efficient identification and measuring of different properties.

Optimizing the value derived from utilization of the raw materials also calls for improved technology and methods for utilizing new assortments and products, and for bucking, sorting and identification of the wood.

The forest products industry, the market and society at large are all imposing stricter requirements on end products in terms of their environmental soundness and energy-efficiency. Skogforsk shall therefore conduct environmental impact analyses on various raw-material supply systems and participate in the development and evaluation of LCA models/methods for forest products.

#### *Efficient and Environmentally Sound Forest Operation Systems*

Continual technological and organizational development of the forest operations system is essential. Maintaining profitable, ecological and sustainable multiple-use forestry is only possible through the use of efficient tools and instruments for production and administration. These must be used by skilled and motivated personnel working in efficient and inspiring organizations, and contractors and family enterprises.

It is strategically important for Sweden to maintain its position among the world leaders in forest technology. In this context, SkogForsk has a vital role as both a driving force behind and coordinator of forest-technology R&D in the country.

The overriding goal of the work on forest operation systems is to *achieve greater efficiency, better utilization of the value inherent in the raw materials, and minimal negative impact on people and the natural environment.*

As regards the general development of machine systems, partial or total automation of machine functions is an urgent requirement. Looking further ahead, the use of autonomous, robotic machine units could be an attractive solution, although the foundations

need to be laid now, through collaboration with manufacturers and other specialists.

R&D directed at the mechanization of silvicultural operations is another urgent task, as is the development of flexible technologies for silviculture and logging that allow efficient implementation of a wide variety of management methods that can be used to control fluctuations in the wood flow.

In logging, the focus will be on non-destructive thinning and processing, more-reliable mensuration, the difficulties associated with smallwood handling, and off-road haulage. To minimize negative effects on the environment, it is necessary to develop production systems that have high fuel-efficiency and soft footprints.

Given the wide geographical spread and complexity of forestry, and the assignment of a greater level of responsibility to a workforce that is declining in number, there is a growing dependence on fast and reliable transmission of a large volume of information – and modern IT is uniquely placed to provide efficient solutions for this. SkogForsk will initiate and play an active part in the development of IT-based systems for planning, supervision and control of operational processes, such as forest surveys and inventories, silviculture, logging and wood-flow management. In some aspects, IT is closely linked to machine technology – e.g., in navigation and positioning systems, in monitoring the status of technical equipment, and in automatic capture of production data. Where appropriate, adapting the ergonomics of information systems to the cognitive abilities of human beings must be observed.

In all probability, forestry activities will become increasingly complex in the future. In this climate of rapid change, the continual development of skills and different organizational, working and management solutions is imperative. Skogforsk's role here will be to support projects for organizational development – primarily at the management-area, district and working-team levels – by imparting the findings and experience of both its own work and that of others. The development activities for continual change involve providing forestry organizations with the knowledge needed for them to use the tools available, to help them understand the different aspects of organizational development, and to enable them to explain the processes to those affected. The involvement of customers and suppliers,

together with the development of contractors and their role in the process, is of vital importance here.

### **Efficient Communication of Knowledge**

Research findings cannot be implemented in practice if people are unaware of them. Skogforsk shall therefore put significant effort into efficient, factual and objective communication of research findings and dissemination of other forest knowledge.

The main target groups are those working in Swedish forestry, where the forestry Act and the high degree of decentralization make it imperative that relevant knowledge be available to all those concerned, including forestry supervisors, contractors and family-enterprise forestry. Only then can the national forestry policy and new methods and technology be successfully implemented.

Through active communication of both new and established knowledge, Skogforsk will continue to be one of the principal information establishments in forestry, thereby actively contributing to the maintenance and enhancement of the skills and expertise among its member enterprises and personnel.

The keener interest being taken in forestry by the general public and others, together with the increasing influence being exerted on forestry from outside the industry, makes it essential that forestry knowledge and accurate information be made available to the general public, the mass media, the public authorities, etc. In addition, given the global economy in which the forest product industry operates and forestry research is pursued, suitable information also needs to be directed towards an international audience. Scientific publications constitute an important and necessary element in this, not least because of the vital part they play in researcher education and quality assurance of R&D work.

As regards communication activities in general, Skogforsk is committed to achieving the highest possible level of self-financing – which benefits both quality and adoption to the needs of the customers. Successful communication of knowledge requires material that has been extensively adapted to different target groups, which, in turn, means that a variety of media and channels must be used. As well as the continual improvement of existing channels, investment shall be made in the development and introduction of communication methods

that utilize the opportunities offered by modern IT. The vision is that anyone requiring information shall be able to access precisely what he or she wants at any given time.

### **Skills Enhancement**

To maintain a high standard in the work conducted under the Framework Programme, the continual development of Skogforsk's staff must be ensured. One element of this involves continual improvement of the collective scientific expertise. Development and testing of new methods and suitable technical aids for both research and information services are similarly important. One aim is to achieve continual improvement of the internal ways of working, for instance, by drawing on instruments for quality management.

The early identification of new development opportunities, possible threats, etc., is crucial to successful R&D work. This means that resources must be made available for monitoring and analysing trends and events in both forestry and the world at large, and at both the national and international levels. In addition, some scope needs to be provided for activities beyond the bounds of the established applied research programmes, e.g., freedom to pursue wider research and information activities, to test new ideas, to predict future trends, etc.

To ensure that the aforementioned work can be done on the required scale, some 10 percent of the funds provided under the Framework Programme should be earmarked for this purpose.

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## Appendix 3.

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# Description of Skogforsk's Publications

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**Resultat** is a popular 4 pp publication in Swedish with conclusions and recommendations from research project findings and cover most of Skogforsk's activities. Some 25 issues per year are published with summaries in English. Older issues can be downloaded at [www.skogforsk.se](http://www.skogforsk.se).

**Results.** 10 issues per year is translated into English (2004, used to be 5 issues per year). Older issues can be downloaded at [www.skogforsk.se](http://www.skogforsk.se)

Target groups Resultat/Results: Forestry (all), researchers.

**Redogörelse.** Comprehensive reports on completed R&D projects and, for instance Environmental Assessments. 6-8 issues per year in Swedish, with summaries in English. 40-120 pp. Redogörelse covers most of Skogforsk's activities.

Target groups: Forestry (staff specialists, region officers, operative process owners with strategic responsibility), authorities, researchers.

**News** is Skogforsk's newsletter: research information, results and marketing in a light, accessible form. 8pp. two issues in English and four issues in Swedish (Nytt). The newsletter can free of charge be down-loaded from [www.skogforsk.se](http://www.skogforsk.se)

Target groups: forestry (all), decision makers, researchers, media and the public.

**PLANTaktuellt** can be described as a combination of Nytt and Resultat: an 8 pp light accessible newsletter concerning nurseries, regeneration, plant and seed material. Edited in co-operation with the University College of Dalarna. 4 issues, 8 pp, per year.

Target groups: forestry (nurseries, silviculture officers and entrepreneurs)

**Handledningar**, in Swedish, give practical advice for the operative work (cleaning, planting, protecting the forests cultural heritage) etc.

Target groups: forestry (operative personnel, entrepreneurs)

**Report:** a report that collects not refereed scientific papers. Terminated in 2002, as costs were high, target group couldn't specify their use for Report, and as a result of the fact that researchers instead can choose to send their papers to a scientific journal or use the form of Redogörelse (that can be in English, if necessary for potential target groups).

Target groups: researchers, forestry (staff specialists), authorities.



## Appendix 4.

# Data on Publications

	Skogforsk-Nytt	Resultat	Redogörelser	Handledningar	Skogforsk News
1999	4	25	3	3	2
2000	4	24	4	1	2
2001	4	20	4	3	2
2002	4	23	7	2	2
2003	4	24	6	3	2
	Results	Reports	Arbetsrapporter (Unpublished reports)	Plantaktuellt	Avelsvärden Breeding values
1999	5	3	31	0	16
2000	5	2	27	4	8
2001	5	4	22	4	7
2002	5	3	32	4	7
2003	5	terminated	38	4	6
<b>External Publications</b>					
	External Publications		Papers & Presentations at Conferences		
1999	81				
2000	65		32		
2001	71		38		
2002	31		37		
2003	63		23		

*Table 3. Summary of Skogforsk's publications in the last five years. Number of publications of each type shown by year.*

**Publications on Regeneration Material**

**Area 1**

Type of Publication	Year									
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Theses (PhD, Lic)	1	1	0	1	0	1	3	3	4	0
Scientific publ. in refereed journals	3	6	6	1	7	13	13	10	18	9
Conference proceedings	9	3	3	2	2	2	2	6	7	0
SF Redogörelse	2	2	2	4	1	2	1	2	3	1
SF Report	1	2	0	0	1	2	1	0	1	3
SF Resultat/Results	3	6	5	2	5	3	3	2	3	2
Work reports	4	4	9	16	5	3	6	7	3	13
Breeding values	7	3	10	16	6	8	16	8	7	4
Other articles (popular science, Yearbook etc.)	0	2	7	4	13	1	2	1	3	3
Articles in PLANTaktuellt								2	7	4
Master theses	1			2					1	
<b>Total</b>	<b>31</b>	<b>29</b>	<b>42</b>	<b>48</b>	<b>40</b>	<b>35</b>	<b>47</b>	<b>41</b>	<b>57</b>	<b>39</b>
Percentage scientific publ. (theses, refereed & proceedings)	42%	34%	21%	8%	23%	46%	38%	46%	51%	23%

2002 refers to up to September that year.

**Publications on Forest Management****Area 2**

Type of Publication	Year			
	2001	2002	2003	2004+ accepted
Thesis (PhD)	4	0	0	
Scientific Publ. in refereed journals	16	12	14	6
Conferens Proceedings	6	9	7	
SF Redogörelse	2	2	4	
SF Report	3	2	0	
SF Resultat/Results	6	9	10	
Work Reports	9	15	6	
Other Articles (popular etc.)	3	3	3	1
Articles in PLANTaktuellt	3	0	1	1
Master thesis			1	
<b>Total</b>	<b>52</b>	<b>52</b>	<b>46</b>	<b>8</b>
Percentage scientific publ. (thesis, refered & proceedings)	50%	40%	46%	73%

To a minor extent "double counting" might have occurred

**Publications on Raw-Material Utilization & Production Systems****Area 3**

Type of Publication	Year			
	2001	2002	2003	2004+ accepted
Thesis (PhD)	1			
Thesis (Lic)				1
Scientific articles in refereed journals	3	4	5	9
Conference Proceedings	26	17	31	
SF Redogörelse		5	5	
SF Resultat/Results	17	16	19	2
Work Reports	25	19	23	
Other Articles (popular etc.)*	6	1	1	1
Master thesis	1	1	3	
<b>Total</b>	<b>79</b>	<b>63</b>	<b>87</b>	<b>13</b>
Percentage scientific publ. (thesis, refered & proceedings)	38%	33%	41%	77%

\*This list is incomplete

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## Appendix 5.

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# Report on Replies to Questionnaires Used to Evaluate Relevance and Dissemination

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As a part of the evaluation two surveys using questionnaires were carried out. The first set of questions was sent to the members of Skogforsk's Managing Board and Advisory Groups (98 % response rate). The second set was sent to the staff members in different field organizations of forestry (81 % response rate). The replies to the questions are summarized here (in Swedish).

## Till Skogforsks styrelse och rådgivande grupper

### 1. Enkäten kommer att behandlas konfidentiellt. Jag godkänner att mina svar registreras i databasen.

Ja	100%	(47 svar)
Nej	0%	(0 svar)
Totalt		47 svar

### 2. Jag är med i

Skogforsks styrelse	23.9%	(11 svar)
RG Skogsodlingsmaterial	28.3%	(13 svar)
RG Produktion och miljö	28.3%	(13 svar)
RG Råvaruförsörjning	19.6%	(9 svar)
Totalt		46 svar

### 3. Är det en kostnadseffektiv lösning att Skogforsk bedriver tillämpad forskning för hela det svenska skogsbrukets räkning?

Ja, mycket	66%	(31 svar)
Ja, till viss del	31.9%	(15 svar)
Nej, inte särskilt	0%	(0 svar)
Nej, inte alls	2.1%	(1 svar)
Vet ej	0%	(0 svar)
Totalt		47 svar

### 4. Arbetar Skogforsk med rätt forskningsuppgifter?

Ja, helt rätt	29.8%	(14 svar)
Ja, till viss del	68.1%	(32 svar)
Nej, sällan	0%	(0 svar)
Nej, inte alls	0%	(0 svar)
Vet ej	2.1%	(1 svar)
Totalt		47 svar

### 5. Påverkar skogsbruket inriktningen på Skogforsks arbete?

Ja, mycket	42.6%	(20 svar)
Ja, till viss del	55.3%	(26 svar)
Nej, inte särskilt	2.1%	(1 svar)
Nej, inte alls	0%	(0 svar)
Vet ej	0%	(0 svar)
Totalt		47 svar

### 6. Bedrivs Skogforsks verksamhet kostnadseffektivt?

Ja, mycket	28.3%	(13 svar)
Ja, till viss del	50%	(23 svar)
Nej, inte särskilt	2.2%	(1 svar)
Nej, inte alls	0%	(0 svar)
Vet ej	19.6%	(9 svar)
Totalt		46 svar

### 7. Får skogsbruket valuta för de pengar man satsar i Skogforsk?

Ja, mycket	42.6%	(20 svar)
Ja, till viss del	46.8%	(22 svar)
Nej, sällan	2.1%	(1 svar)
Nej, inte alls	0%	(0 svar)
Vet ej	8.5%	(4 svar)
Totalt		47 svar

### 8. Anstränger sig Skogforsk tillräckligt för att publicera sina forskningsresultat?

Ja, alltid	68.1%	(32 svar)
Ja, till viss del	31.9%	(15 svar)
Nej, sällan	0%	(0 svar)
Nej, inte alls	0%	(0 svar)
Vet ej	0%	(0 svar)
Totalt		47 svar

### 9. Vilka typer av publikationer från Skogforsk har du tagit del av det senaste året?

Skogforsk-Nytt	23.6%	(46 svar)
Resultat	23.6%	(46 svar)
Redogörelser	20.5%	(40 svar)
Plantaktuellt	11.8%	(23 svar)
Handböcker	4.6%	(9 svar)
Kunskap direkt (hemsidan)	13.3%	(26 svar)
Filmer	2.6%	(5 svar)
Inte någon	0%	(0 svar)
Totalt		47 svar

### 10. Är Skogforsks publikationer bra?

Ja, mycket	72.3%	(34 svar)
Ja, till viss del	27.7%	(13 svar)
Nej, inte särskilt	0%	(0 svar)
Nej, inte alls	0%	(0 svar)
Vet ej	0%	(0 svar)
Totalt		47 svar

### 11. Vilka typer av aktiviteter i Skogforsks regi (förutom styrelse- och RG-möten) har du varit med på under det senaste året?

Kurser	8.7%	(6 svar)
Konferenser	39.1%	(27 svar)
Exkursioner	17.4%	(12 svar)
Övrigt	14.5%	(10 svar)
Inte någon	20.3%	(14 svar)
Totalt		46 svar

### 12. Är Skogforsk bra på att anordna kurser, konferenser och exkursioner?

Ja, mycket	74.5%	(35 svar)
Ja, till viss del	23.4%	(11 svar)
Nej, inte särskilt	0%	(0 svar)
Nej, inte alls	0%	(0 svar)
Vet ej	2.1%	(1 svar)
Totalt		47 svar

### 13. Är Skogforsks kurser och konferenser prisvärda?

Ja, alltid	21.3%	(10 svar)
Ja, till viss del	66%	(31 svar)
Nej, sällan	2.1%	(1 svar)
Nej, inte alls	0%	(0 svar)
Vet ej	10.6%	(5 svar)
Totalt		47 svar

### 14. Kan man lita på forskningsresultaten från Skogforsk?

Ja, alltid	38.3%	(18 svar)
Ja, till viss del	55.3%	(26 svar)
Nej, sällan	0%	(0 svar)
Nej, inte alls	0%	(0 svar)
Vet ej	6.4%	(3 svar)
Totalt		47 svar

### 15. Går det att tillämpa Skogforsks forskningsresultat?

Ja, alltid	8.5%	(4 svar)
Ja, till viss del	85.1%	(40 svar)
Nej, sällan	2.1%	(1 svar)
Nej, inte alls	0%	(0 svar)
Vet ej	4.3%	(2 svar)
Totalt		47 svar

### 16. Tillämpas Skogforsks resultat tillräckligt i skogsbruket?

Ja, mycket	12.8%	(6 svar)
Ja, till viss del	61.7%	(29 svar)
Nej, sällan	8.5%	(4 svar)
Nej, inte alls	2.1%	(1 svar)
Vet ej	14.9%	(7 svar)
Totalt		47 svar

### 17. Anstränger sig Skogforsk tillräckligt för att deras forskningsresultat ska tillämpas i skogsbruket?

Ja, alltid	23.4%	(11 svar)
Ja, till viss del	53.2%	(25 svar)
Nej, sällan	17%	(8 svar)
Nej, inte alls	0%	(0 svar)
Vet ej	6.4%	(3 svar)
Totalt		47 svar

### 18. Anstränger sig skogsbruket tillräckligt för att Sortera efter denna fråga tillgodogöra sig och tillämpa forskningsresultaten från Skogforsk?

Ja, alltid	4.3%	(2 svar)
Ja, till viss del	61.7%	(29 svar)
Nej, sällan	27.7%	(13 svar)
Nej, inte alls	0%	(0 svar)
Vet ej	6.4%	(3 svar)
Totalt		47 svar

**19. Skulle en större samverkan mellan Skogforsk och skogsbruket medföra att resultaten tillämpades ytterligare?**

Ja, säkert	40.4%	(19 svar)
Ja, till viss del	44.7%	(21 svar)
Nej, inte troligt	10.6%	(5 svar)
Nej, inte alls	0%	(0 svar)
Vet ej	4.3%	(2 svar)
Totalt		47 svar

**20. Övriga kommentarer:**

## Utvärdering av Skogforsks arbete

### 1. Enkäten kommer att behandlas konfidentiellt. Jag godkänner att mina svar registreras i databasen.

Ja	100%	(76 svar)
Nej	0%	(0 svar)
Totalt		76 svar

### 2. Jag arbetar huvudsakligen med

Skogsodling/Föryngring	6.8%	(5 svar)
Skogsvård/Skogsskötsel	27%	(20 svar)
Avverkning/Virke	29.7%	(22 svar)
Transport/Vägar	12.2%	(9 svar)
Natur/miljö	5.4%	(4 svar)
Annat	18.9%	(14 svar)
Totalt		74 svar

### 3. Jag arbetar på

Stab	20%	(15 svar)
Region	29.3%	(22 svar)
Distrikt	42.7%	(32 svar)
Övrigt	8%	(6 svar)
Totalt		75 svar

### 4. Är det bra att Skogforsk bedriver tillämpad forskning för hela det svenska skogsbrukets räkning?

Ja, mycket	81.3%	(61 svar)
Ja, till viss del	18.7%	(14 svar)
Nej, inte särskilt	0%	(0 svar)
Nej, inte alls	0%	(0 svar)
Vet ej	0%	(0 svar)
Totalt		75 svar

### 5. Arbetar Skogforsk med rätt forskningsuppgifter?

Ja, helt rätt	13.2%	(10 svar)
Ja, till viss del	82.9%	(63 svar)
Nej, sällan	0%	(0 svar)
Nej, inte alls	0%	(0 svar)
Vet ej	3.9%	(3 svar)
Totalt		76 svar

### 6. Påverkar skogsbruket inriktningen på Skogforsks arbete?

Ja, mycket	21.1%	(16 svar)
Ja, till viss del	60.5%	(46 svar)
Nej, inte särskilt	2.6%	(2 svar)
Nej, inte alls	0%	(0 svar)
Vet ej	15.8%	(12 svar)
Totalt		76 svar

### 7. Anstränger sig Skogforsk tillräckligt för att publicera sina forskningsresultat?

Ja, alltid	45.3%	(34 svar)
Ja, till viss del	42.7%	(32 svar)
Nej, sällan	4%	(3 svar)
Nej, inte alls	0%	(0 svar)
Vet ej	8%	(6 svar)
Totalt		75 svar

### 8. Vilka typer av publikationer från Skogforsk har du tagit del av det senaste året?

Skogforsk-Nytt	23.9%	(66 svar)
Resultat	26.1%	(72 svar)
Redogörelser	16.7%	(46 svar)
Plantaktuellt	9.8%	(27 svar)
Handböcker	6.9%	(19 svar)
Kunskap direkt (hemsidan)	13.4%	(37 svar)
Filmer	2.9%	(8 svar)
Inte någon	0.4%	(1 svar)
Totalt		76 svar

### 9. Är Skogforsks publikationer bra?

Ja, mycket	47.4%	(36 svar)
Ja, till viss del	52.6%	(40 svar)
Nej, inte särskilt	0%	(0 svar)
Nej, inte alls	0%	(0 svar)
Vet ej	0%	(0 svar)
Totalt		76 svar

### 10. Vilka typer av aktiviteter i Skogforsks regi har du varit med på under det senaste året?

Kurser	20%	(21 svar)
Konferenser	44.8%	(47 svar)
Exkursioner	9.5%	(10 svar)
Övrigt	10.5%	(11 svar)
Inte någon	15.2%	(16 svar)
Totalt		75 svar

### 11. Är Skogforsk bra på att anordna kurser, konferenser och exkursioner?

Ja, mycket	64%	(48 svar)
Ja, till viss del	22.7%	(17 svar)
Nej, inte särskilt	0%	(0 svar)
Nej, inte alls	0%	(0 svar)
Vet ej	13.3%	(10 svar)
Totalt		75 svar

### 12. Är Skogforsks kurser och konferenser prisvärda?

Ja, alltid	14.5%	(11 svar)
Ja, till viss del	59.2%	(45 svar)
Nej, sällan	10.5%	(8 svar)
Nej, inte alls	0%	(0 svar)
Vet ej	15.8%	(12 svar)
Totalt		76 svar

### 13. Kan man lita på forskningsresultaten från Skogforsk?

Ja, alltid	23.7%	(18 svar)
Ja, till viss del	71.1%	(54 svar)
Nej, sällan	1.3%	(1 svar)
Nej, inte alls	0%	(0 svar)
Vet ej	3.9%	(3 svar)
Totalt		76 svar

### 14. Går det att tillämpa Skogforsks forskningsresultat?

Ja, alltid	1.3%	(1 svar)
Ja, till viss del	93.4%	(71 svar)
Nej, sällan	5.3%	(4 svar)
Nej, inte alls	0%	(0 svar)
Vet ej	0%	(0 svar)
Totalt		76 svar

### 15. Tillämpas Skogforsks resultat tillräckligt i skogsbruket?

Ja, mycket	5.3%	(4 svar)
Ja, till viss del	63.2%	(48 svar)
Nej, sällan	15.8%	(12 svar)
Nej, inte alls	0%	(0 svar)
Vet ej	15.8%	(12 svar)
Totalt		76 svar

### 16. Anstränger sig Skogforsk tillräckligt för att deras forskningsresultat ska tillämpas i skogsbruket?

Ja, alltid	6.6%	(5 svar)
Ja, till viss del	36.8%	(28 svar)
Nej, sällan	32.9%	(25 svar)
Nej, inte alls	0%	(0 svar)
Vet ej	23.7%	(18 svar)
Totalt		76 svar

### 17. Anstränger sig skogsbruket tillräckligt för att tillgodogöra sig och tillämpa forskningsresultaten från Skogforsk?

Ja, alltid	2.6%	(2 svar)
Ja, till viss del	51.3%	(39 svar)
Nej, sällan	32.9%	(25 svar)
Nej, inte alls	1.3%	(1 svar)
Vet ej	11.8%	(9 svar)
Totalt		76 svar

### 18. Skulle en större samverkan mellan Skogforsk och skogsbruket medföra att resultaten tillämpades ytterligare?

Ja, säkert	64.9%	(48 svar)
Ja, till viss del	28.4%	(21 svar)
Nej, inte troligt	1.4%	(1 svar)
Nej, inte alls	0%	(0 svar)
Vet ej	5.4%	(4 svar)
Totalt		74 svar

### 19. Övriga kommentarer:

Formas, the Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning, is a governmental research-funding agency. Formas encourages and supports scientifically significant research related to sustainable development.



Forskningsrådet för miljö, areella näringar och samhällsbyggande, Formas  
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