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Goal-setting for Finnish forest research policy of the 1970's

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Matti Palo

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GOAL-SETTING FOR FINNISH FOREST RESEARCH POLICY OF THE 1970's

A plan concerning the potential effectiveness of forest research activities in the implementation of the Government science policy program

MATTI PALO

SELOSTE:

SUOMEN METSÄNTUTKIMUSPOLITIIKAN SUUNTAVIIVAT 1970-LUVULLA

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PREFACE

The Science Policy Council (Valtion tiedeneuvosto) is the highest advisory body for science administration in Finland. In the beginning of 1973 it launched a program on science policy, which was later approved by the Government and also put before Parliament.

Later on the year the Academy of Finland established a working group to plan for initiating implementation of the program. This group asked the National Research Council for Agriculture and Forestry to provide some information pertaining to that task. The forestry section of this Council in turn asked me to prepare this plan. The forestry section included KULLERVO KUUSELA as the chairman, SEPPO ERVASTI, LAURI HEIKINHEIMO, ESKO KANGAS and TAPIO KORPELA. These persons commented on the drafts of this paper and acted as a panel for a Delphi-evaluation.

The plan was originally written in Finnish, and the completed English version was worked out as a cooperative effort by my wife ANNE-MARIE PALO and myself. JAMES P. CUNNINGHAM commented on this text and checked the English language. In addition to the above persons several others commented on the Finnish draft. I wish to express my sincere gratitude to these persons.

Helsinki, October 1973

MATTI PALO

CONTENTS

1. INTRODUCTION

1. 1. Framework for goal-setting

According to the time-horizon and content of planning the following categories can be identified. (1) *In normative planning*, finding out and formulating objectives and goals is emphasized. (2) *In strategic planning* the most important lines of activities are searched. (3) Organizational structures are developed by means of *administrative planning*. (4) Finally, the choice of alternative means and scheduling of their execution form the essence of *operational planning*.

As to time-horizon, normative and strategic planning imply long-term and partly medium-term, administrative planning medium-term and operational planning short-term intervals.

The purpose of *normative planning* is to formulate alternative futures of factors which are important for the planning organization. In the same context an evaluation based on the needs of the organization is made concerning the desirability of these futures. Finally, the output of normative planning defines the target state of the object system towards which other planning, as well as execution of the plans should strive.

On the other hand, the aim in *strategic planning* is to survey and evaluate the alternative means which are available at a high hierarchic level for achieving the target state defined by normative planning.

The evaluation of objectives and means in normative and strategic planning is generally based on the existing structure of values of a society at the moment of planning. Hence, the content of this science policy plan ought to be re-evaluated at intervals of a couple of years, although planning is extended to the end of the 1970's. (Cf. VIRKKUNEN 1973.)

Relevance tree technique (cf. OECD 1972, pp. 50—51) was chosen as a primary approach to be applied in this paper. This term refers to systematizing the relationships between goals and means at different organizational levels by formulating hierarchies of goals and means. According to this approach, a particular activity can be a goal when viewed from below but a means when viewed from the top.

In Fig. 1 the relevance tree model applied in this paper is introduced. First of all the mission of forest research is to be formulated. At the second stage the objectives of forest

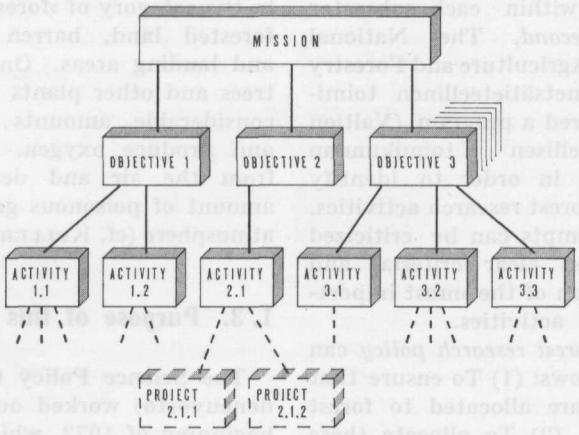

Fig. 1. The relations of a mission, objectives, activities and projects in a goal-means hierarchy (relevance tree approach).

research policy are to be constructed in order to promote the mission fixed for forest research. Each objective is supported at a lower hierarchic level by one or more forest research activities. These activities are means to achieve the objectives, but stand as goals in executing forest research projects at a level one step lower.

Arriving at a useful plan presupposes a definition of the system under planning at least in the following respects: (1) fixing the boundaries of the physical object under planning, (2) identifying the decision-makers for whom the plan is prepared, (3) setting the length of time horizon of the plan, (4) prescribing the extent of planning activities, (5) evaluating resources available and other restrictions.

1. 2. Forest research policy

In Finland two major attempts to formulate the main lines of national forest research policy have been recently carried out. *First*, the Society of Forestry in Finland (Suomen Metsätieteellinen Seura) set up five teams in 1965 to evaluate the future needs of forest research in Finland. In the final report (Forestry research in Finland and its further development 1967. Silva Fennica 1 (121):4) the target number of research workers, funds, sources of financing and allocation of resources among the various subsectors of forest research were introduced. Also the most important research activities within each subsector were identified. *Second*, The National Research Council of Agriculture and Forestry (Valtion maatalous-metsätieteellinen toimikunta) in 1971 prepared a program (Valtion maatalous-metsätieteellisen toimikunnan runko-ohjelma 1971) in order to identify the most important forest research activities.

Both of these attempts can be criticized in that they lacked clear criteria and methods for evaluation of the »most important» forest research activities.

The functions of forest research policy can be formulated as follows: (1) To ensure that adequate resources are allocated to forest research by society. (2) To allocate these resources appropriately to the various sectors of forest research and (3) to promote the effective utilization of research findings for the attainment of the objectives of forest and societal policy. *Normative and strategic planning of forest research is required for carrying out appropriate forest research policy.* Accordingly, these categories of planning are applied in this paper.

The object for forest research is *a forest system* broadly conceived. The forest system can be defined as one which is concerned with making, distributing and consuming the goods and services of the forest. Besides primary forestry production, manufacturing of forest products, distribution and consumption of all products and services originating from the forests are also included in this forest system. On the other hand, the content of the forest system can be considered as an application of the definition of general systems. The people, trees, other plants, animals, other organisms, machines, equipment, buildings, soil, water and atmosphere can be considered as elements of the forest system. The relationships regulating the various links between the states of elements are also essential parts of the forest system. (Cf. PALO 1971, pp. 9—22.)

Forest is an essential concept within the forest system. Wood produced by forests and all wood-based products comprise half of Finland's exports and about 14 % of her GNP. Furthermore, in Finland forests have a vital role from the environmental point of view, because 73 % of the land area is covered by forest and 87 % belongs in the category of »forestry land» including forested land, barren land, forest roads and landing areas. On the other hand, the trees and other plants of forests assimilate considerable amounts of carbon dioxide and produce oxygen. Forests absorb dust from the air and decrease the relative amount of poisonous gases (e.g. SO_2) in the atmosphere (cf. KELLER 1971, pp. 607—610).

1. 3. Purpose of this paper

The Science Policy Council (Valtion tiedeneuvosto) worked out a program in the beginning of 1973, which was approved by the Government as a first comprehensive plan for national science policy in Finland.

A social reform and an increase in the welfare of people is considered as a *major objective for general societal policy* in this program. At the same time, inequality is to be decreased between Finland's various districts and also between the various social groups of the nation. However, production is not to be allowed to detrimentally affect either the health of the workers or the state of the environment. The Science Policy Council has chosen the following research activities (cf. Valtion Tiedeneuvosto 1973, pp.16–21) as the primary means to achieve these objectives (The order of listing does not imply priority):

— Public health
— People's living conditions and development factors in the national structure of production
— Environmental protection and development of new production methods which save both natural resources and environment
— Democracy and equality in the Finnish society
— Working life and working conditions

The ultimate purpose of this paper is to design the goals for Finland's forest research policy in the 1970's in order to promote the implementation of the five general science policy objectives as stated above. Particularly, the science administration of the Academy of Finland is supposed to apply the results of this paper, when allocating resources available to various sectors of science and especially to forest research in such a way that they would effectively support the realization of the program of the Science Policy Council. On the other hand, this plan can also be considered as a guide for the choice of new research projects by the forest research workers.

2. EXTERNAL LINKS OF FOREST RESEARCH POLICY

National forest research policy is primarily aimed at promoting the realization of the main objectives of both *forest policy* and general societal policy (cf. Section 1.2). The development of the whole national society is to be controlled according to the objectives of general societal policy. The objectives for forestry and other sectors of national society ought to be coordinated and built in such a way that they effectively support the realization of the objectives of general societal policy.

The *industrial policy* followed affects strongly the demand for wood produced by the forests and through it other elements and relationships of the forest system. About 11 % of the total land area of Finland is used for *agricultural* purposes. Especially on farms the same land, same labor and same machines can often be utilized either alternatively or periodically for agricultural and forestry production. Both economic and environmental policies are supposed to be linked to forest research policy either through these three sectors or directly from general societal policy.

According to the program of the Science Policy Council science policy has been considered as a means in the realization of general societal objectives. Similarly, forest research policy can be regarded as a means when striving towards forestry, industrial and agricultural objectives. At the same time, however, forest research policy should also support prevailing general science policy. These links of forest research policy are visualised in Fig. 2.

The detailed objectives of the whole society and those of the particular sectors have never officially been exactly expressed in Finland. In order to find out the mission and the objectives needed in this paper (Sections 3.1 and 3.2) information incorporated in various decrees, statutes, administrative directives, committee reports and other equivalent official material was utilized.

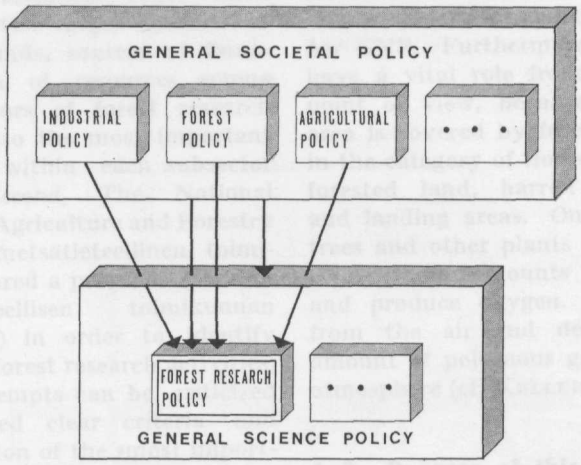

Fig 2. The major links of forest research policy.

3. GOAL-SETTING FOR FOREST RESEARCH POLICY

3. 1. Mission of forest research

The mission of forest research should answer the question of why forest research is needed by the society. Furthermore, a clearly expressed mission is required to form a basis for setting objectives to support the mission. Accordingly, a careful formulation of the mission plays a major role in the control of overall forest research policy. An operational mission should be neither too widely nor too narrowly expressed. It must be defined so that it is concrete enough for setting present objectives, but that it still leaves free play for future changes of objectives. It is not necessary to fix the time-horizon of a mission.

The statute of the Finnish Forest Research Institute (Metsäntutkimuslaitos) defines the mission of this institute as follows: The mission of the Finnish Forest Research Institute is to carry out research and experiments for an appropriate development of Finland's forestry and logging industry. The following general mission can be derived from the above definition: *The mission of the forest research financed by the Government is to carry out research and development work for an appropriate promotion of Finland's forest system* (defined on p. 6 above).

Forest research workers utilize especially the results of fundamental research achieved mainly in natural and social fundamental sciences. Hence, particular fundamental research on the forest system can be restricted only to cases where the results of general fundamental sciences are not available. *Fundamental research* here refers to systematic activities to find out new scientific knowledge without simultaneous conscious striving for practical applications.

On the other hand, *applied research* is here defined as systematic activities to find out new scientific or technological knowledge readily applicable to achieve practical goals. In order to appropriately promote the forest system of Finland, forest research financed by the Government should be comprised predominantly of applied research.

Development work refers to experimental activities directed to develop new products, production factors and methods based on research results and other available information. Hence, the results of development work are often in rather readily marketable form. Consequently, the firms of the forest system have the main responsibility for financing the development work needed. However, in certain cases the Government is also obliged to finance development work especially when it is linked closely to applied research or when it is in a special category.

As derived from the statements above forest research financed by the Government is supposed to produce results primarily to »improve» the quality of decisions made by various decision groups in the forest system. These decisions again affect the states and relationships of the elements of the forest system *(inter alia* the members of various interest groups). The knowledge produced by forest research is transferred forward in this way and finally affects the objectives of forest policy and to some extent also those of industrial policy, agricultural policy and general societal policy (cf. Fig. 2, p. 8).

3. 2. Objectives of forest research policy

The mission above gives the main direction for controlling forest research policy. A more detailed direction can be expressed by defining specific objectives. An objective here refers to a target state of the forest system or a change in such a state in the long term. Objectives are required in those sectors of the forest system on which the appropriate development of the forest system mainly depends. The objectives to be selected must be operational enough to enable the selection of more narrow goals (forest research activities) at a lower level. These goals can also be viewed as means to

achieve the objectives in the context of a goal-means hierarchy (cf. Fig. 1, p. 5).

The content of the mission and the external links of forest research policy (Fig. 2, p. 8) formed the two major bases in this search for operational objectives. Statutes, committee reports and other equivalent official material concerning forest research, forestry, industry, agriculture and general societal policy were analysed. In this way the following objectives for the policy on forest research financed by the Finnish Government were derived. There is no ordering by priority.

(1) Improvement of the state of the forest ecosystem.
(2) Ensuring progressive timber output in accordance with economic and ecological advantages.
(3) Feasible exploitation of non-timber commodities and services produced by the forest ecosystem.
(4) Improvement in the living and working conditions and the health of people employed by the forest system and reduction of unemployment and of other factors causing inequality for these people.
(5) Efficient exploitation of the production factors of the forest system.
(6) Increase of Finland's input into international forest research, especially of that concerning the developing countries.
(7) Promotion of education and vocational training within the forest system, particularly among the forest research workers.
(8) Development of the level of living in Finnish developing regions by means of the forest system.
(9) *Problem-oriented and interdisciplinary approach with due consideration to the laws of ecosystems.*

3. 3. Forest research activities

Nature of a forest research activity

The last of the objectives above is to be conceived as a general recommendation concerning all the other objectives. The preceding eight objectives were divided further into forest research activities, or goals in a narrow meaning, acting on a hierarchic level one step lower. These activities were selected and defined in such a way that by executing them forest research policy approaches the objectives set up. In this sense the activities are means to achieve the objectives. On the other hand a forest research activity can be further divided into research projects. From this point of view an activity is a goal for executing projects. (The idea of goal-means hierarchy, cf. Fig. 1, p. 5.)

Research activities were defined so that they are more narrow and short-term than the objectives. The actual selection of forest research activities was carried out partly from above, by analysing and dividing the objectives, and partly from below by a careful review of most recent forest research programs (cf. KUUSELA 1972, pp. 214—224; Valtion maatalous-metsätieteellinen toimikunta 1971, pp. 4—6; Suomen Metsätieteellinen Seura 1967, pp. 36—53). The forest research activities best supporting each of the eight objectives (1—8) above are presented in the following subsections along with the objectives.

Improvement of the state of the forest ecosystem

a) Protection of forests or prevention of forest damages (development of methods to prevent and to forestall damages and to find out effects of animals, fungi and microbes injurious to the forest and/or to its products)

b) Development of ecological models to describe, explain and forecast the functioning of the forest ecosystem and its subsystems

c) Research on forest policy connected with the state of the forest ecosystem (e.g. legislation, juridical practice, classification of forest landscapes)

d) Interactions between the forest ecosystem and its environment (air, waters, soil, ground water etc.)

Ensuring progressive timber output in accordance with economic and ecological advantages

e) Breeding of forest trees

f) Physiology of tree growth, growth and yield of forest stands

g) Interactions between forest soils and reforestation

h) Ecology and cost-benefit analysis of drainage of peatlands, reforestation, afforestation, forest roads and fertilization of forests

i) Development of econometric macro models to describe, explain and forecast the functioning of the forest system and its subsystems

j) Forecasting demand for, supply and prices of various commodities and services produced by the forest system

Feasible exploitation of non-timber commodities and services produced by the forest ecosystem

k) Production, distribution and consumption of recreational services produced by forests

l) Tangible non-timber production by the forest ecosystem (wildlife, lichens, berries, mushrooms etc.) and its exploitation

Improvement of living and working conditions and health of people employed by the forest system and reduction of unemployment and of other factors causing inequality for these people

m) Lessening human and ecological stress caused by working methods used in forestry and logging (e.g. by ergonomic studies)

n) Development of cooperation among forest owners and other entrepreneurs of the forest system

o) Describing, explaining and forecasting of human behavior in relation to the forest

p) Development of the systems of scaling, prices and wages

Efficient exploitation of the production factors of the forest system

q) Business economics and cost-benefit analysis of land, growing stock, machines and labor available for both agriculture and forestry (including logging)

r) Development of specific material balances for wood to indicate potential raw material reserves and to promote the use of circular technology based on ecological principles

Increase of Finland's input into international forest research, especially of that concerning the developing countries

s) Potentialities of Finland's forest system in the progress of the developing countries

Promotion of education and vocational training within the forest system and particularly that among the forest research workers

t) Requirements for education and vocational training within the forest system (concerning forest owners, forest workers, forest research workers, the public etc.)

Development of the level of living in Finnish developing regions by means of the forest system

u) Regional impacts of the forest system (especially in the developing regions)

v) Development of the forest taxation system in order to level social inequality

4. EVALUATION OF PRIORITIES FOR FOREST RESEARCH ACTIVITIES

Each of the forest research activities presented in the previous Section supports some of the objectives for forest research policy set up in Section 3.2. Each activity forms a wider study object, which is a goal from the standpoint of an individual research worker or team. The realization of this goal can be promoted by execution of research projects under this goal.

A simplified Delphi technique was applied to find out the impacts of the selected forest research activities on the five general science policy objectives defined by the Science Policy Council (cf. Section 1.3.). All members from the team of six experts evaluated individually by questionnaire (see Appendix 1) each forest research activity in relation to its potential impact on the above five objectives. In order to find out all »essential impacts» each expert was asked to imagine a typical research project within each forest research activity and to estimate the main results produced by this project if it were executed. Furthermore, the experts had to identify the routes through various decision groups to the five objectives of the Science Policy Council. This way each expert evaluated whether there was or was not any essential impact from a forest research activity to any of the five objectives.

After the first round of evaluation, the results were synthesised and an open discussion was carried out. Especially, the experts were asked to give their reasons for disagreeing with the opinions of other experts. Subsequently, another round of individual evaluation by questionnaire was executed.

The conclusion was reached that all forest research activities support at least one of the five objectives. Most activities seemed to support primarily the objective concerning people's living conditions and the structure of production. The other objectives were supported in the following order: (2) environmental protection, (3) democracy and equality, (4) working life and conditions and (5) public health (Appendix 2).

The Science Policy Council expressed the five objectives for applied research without mutual priorities (Valtion Tiedeneuvosto 1973, p. 16). Hence the objectives were considered equal. Consequently, the more numerous the experts of the panel were who recognized an essential impact on an objective by a research activity the more worthwhile this activity was regarded from the standpoint of the program by the Science Policy Council. The impact was strengthened in cases where links to more than one objective were found (Appendix 2). Based on these criteria *the following forest research activities were selected into the group having the most effective impact* on the objectives of the Science Policy Council's program:

- Requirements for education and vocational training within the forest system (t)
- Production, distribution and consumption of recreational services produced by forests (k)
- Lessening human and ecological stress caused by working methods used in forestry and logging (m)
- Protection of forests and prevention of forest damages (a)
- Interactions between the forest ecosystem and its environment (d)
- Tangible non-timber production by the forest ecosystem and its exploitation (l)

The order of listing does not convey any further ranking. Then these forest research activities were selected into the group having second most effective impact on the objectives of the Science Policy Council's program:

- Ecology and cost-benefit analysis of drainage of peatlands, reforestation, afforestation, forest roads and fertilization of forests (h)
- Business economics and cost-benefit analysis of land, growing stock, machines and labor available for both agriculture and forestry (including logging) (q)
- Regional impacts of the forest system (especially in the developing regions) (u)
- Forecasting demand for, supply and prices of various commodities and services produced by the forest system (j)
- Development of the systems of scaling, prices and wages (p)

5. DISCUSSION

5. 1. Methodological aspects

The elements of general planning theory formed a framework apparently needed also in science policy planning. The relevance tree approach provided a systematic way to form nine forest research policy objectives and to determine 22 forest research activities. A concensus was derived concerning these objectives and activities by the experts of the panel. With more detailed analysis some additional important forest research activities might have been found. The advantages and disadvantages of the relevance tree approach as applied in science policy planning are discussed in an OECD (1972, pp. 50—51) report. It concludes: »However, relevance trees may be useful in identifying areas of exploratory research that should be supported in relation to a policy objective».

A systematic procedure to recognize the essential impacts of forest research activities on the five objectives of the Government science policy program was carried out. The degree of measurement was highly simplified: (a) an impact was found (= 1) and (b) no impact was found (= 0). This made the evaluation clear and fast to carry out. Only two evaluation rounds were executed before the concensus was reached. The original idea was to widen the scale used at some later round, but because the panelists were already satisfied with the results after two rounds no further experiment was done.

The decisions based partly on the results of this paper may involve the allocation of resources among various sectors of science or among alternative lines of action, where an explicit consideration of costs and benefits may be necessary. However, the scope of this plan was conciously limited to the above kind of »impact analysis» instead of cost-benefit or cost-effectiveness analysis. This was due to the restricted purpose of this paper. No *individual research project* was either planned or proposed. Ex ante estimating and evaluating the costs and benefits of research is a particularly difficult and complicated problem requiring the detailed specification of individual projects.

For this paper the panel was composed only of six persons. Usually when a Delphi technique is applied more experts are invited to participate. It would have been rather interesting, if the time and funds had been available that the panel could have been formed of all active forest research workers of Finland, or of a representative sample of them. The Delphi technique seems to eliminate certain faults of a traditional committee procedure. It seems also to be faster and cheaper than such a committee. However, many abuses and limitations may also occur when applying the Delphi technique in science policy planning (cf. OECD 1972, pp. 43—44).

Rather few of the forest research activities introduced above strongly support the realization of democracy and equality in Finnish society. If this objective in particular were to be stressed, *the development of the forest taxation system* would have become important, as the present system can be regarded as increasing inequality both regionally and between various social groups.

Research activity (s) above concerning the developing countries did not fit nicely with the priority criteria used. Consequently, in spite of the poor success of this activity in overall priorities, *studying the potentialities of Finland's forest system in the progress of developing countries would provide an effective means for Finland's contribution to solving underdevelopment and for striving to decrease inequality between nations.*

This paper can be regarded as a case of *open decision-making.* The selection of the two categories of forest research activities most effectively supporting the Government science policy program (p. 13) was based on explicit criteria and methods. They will hopefully be criticized to the extent that when this plan is reviewed

within a couple of years better criteria and methods can be applied.

»There is no objective and technical method of fixing the terms of reference, the limits and the assumptions of any analysis. Only the policy maker, through the democratic process, can do this. And he can only do this if the information and the analysis are presented to him in a form that he can understand. Given these dangers inherent in any complex analysis, assumptions, methods and the interpretation of results should always be »visible». And perhaps there should also be pluralism in analysis and analytical ability, in various parts of the government structure, and also in the legislature and the public at large, thereby increasing the probability that unjustified assumptions, methods and interpretations will be smoked out.» (OECD 1972, p. 32.)

Finally, it is interesting to note today that »Planning and evaluation of forestry programs and policies» as well as »Survey and evaluation of forestry research programs» were included among 127 research topics for forest economists as early as 1953 by DUERR and VAUX (editors of »Research in the Economics of Forestry»). They stress in this context that »one question which will often arise concerns the point at which research ends and policy-making begins» (DUERR & VAUX 1953, p. 79). The idea adopted by the present author is that this kind of activity is regarded as *policy planning* which interacts and links research and policy-making.

5. 2. Coordination of forest research

In Finland the Ministry of Agriculture and Forestry has the main responsibility for forest research financed by the Government. These Government units are The Finnish Forest Research Institute (Metsäntutkimuslaitos) and the Development Section of The State Board of Forestry (metsähallinnon kehittämisjaosto). The Foundation for Forest Tree Breeding (Metsänjalostussäätiö) and The Work Efficiency Association (Työtehoseura) are private research organizations operating partly under the above Ministry, because they are partly financed by the Government. Forest research activities carried out by The National Research Council for Agriculture and Forestry (Valtion maatalous-metsätieteellinen toimikunta) and by the Faculty of Agriculture and Forestry, Helsinki University (Helsingin yliopiston maatalous-metsätieteellinen tiedekunta) are under the Ministry of Education.

Long-term forest research activities have so far been executed mainly by the Finnish Forest Research Institute, primarily because it has more stable financing possibilities, especially when compared with the University. The state budget should also allocate enough money for the forest research done by the Faculty of Agriculture and Forestry.

The National Research Council for Agriculture and Forestry has no discipline-based organization. Accordingly the resources of this Council can be allocated more fluidly according to the actual objectives than those of any other forest research unit. The Council can thus allocate resources also to the activities which may be neglected by other research units. (Cf. HOLOPAINEN 1973.)

At present no organization exists in Finland to hold the responsibility for centralized planning and coordination of Government financed forest research in its entirety. Recently an equivalent unit (maataloustutkimuksen neuvottelukunta) was established for agricultural research under the Ministry of Agriculture and Forestry. *This kind of coordinative role could be vested in the National Research Council for Agriculture and Forestry.* This task has already been mentioned in the existing statutes of the Council (Asetus tieteellisen . . . 1969, 8 §: 1), but has so far been neglected in practice.

The Finnish Game and Fisheries Research Institute (Riista- ja kalatalouden tutkimuslaitos) and research on forest industries by the Technical Research Center of Finland (Valtion teknillinen tutkimuskeskus) and by Helsinki University of Technology (Teknillinen korkeakoulu) are focused outside traditional forest research. However, they touch upon essential parts of the forest system. An appropriate inclusion of these units under the coordinative unit would be preferable.

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Seloste:

SUOMEN METSÄNTUTKIMUSPOLITIIKAN SUUNTAVIIVAT 1970-LUVULLA

Tämä työ käynnistyi Suomen Akatemian maatalous-metsätieteellisen toimikunnan pyynnöstä. Valtion tiedeneuvoston vuonna 1973 laatimassa ja sittemmin hallituksen vahvistamassa tiedepoliittisessa ohjelmassa (Suomen tiedepolitiikan suuntaviivat 1970-luvulla, Helsinki. 1973.) esitetään, että yhteiskuntapolitiikan keskeisenä päämääränä voidaan Suomessa pitää yhteiskunnan uudistamista ja ihmisten hyvinvoinnin lisäämistä siten, että eriarvoisuus maamme eri osien ja kansamme eri ryhmien välillä vähenee ja että tuotannolla ei aiheuteta haittaa työntekijöiden terveydelle eikä vahingollisia muutoksia ympäristölle. Näiden päämäärien saavuttamisen ensisijaisiksi tiedepoliittisiksi keinoiksi valtion tiedeneuvosto on valinnut seuraavat tutkimuskohteet:

— Kansanterveys
— Väestön elinehdot sekä kansallisen tuotantorakenteen kehitystekijät
— Ympäristönsuojelu sekä luonnonvaroja ja ympäristöä säästävien menetelmien kehittäminen
— Demokratian ja tasa-arvoisuuden toteutuminen suomalaisessa yhteiskunnassa
— Työelämä ja työolosuhteet

Tämän työn tarkoituksena on hahmottaa Suomen metsäntutkimuspolitiikan 1970-luvun tavoitteita edellä esitetyn viiden tiedepoliittisen painopistealueen tutkimisen edistämiseksi. Suunnitelma on tarkoitettu erityisesti Suomen Akatemian tiedehallinnon apuvälineeksi ohjattaessa käytettävissä olevia voimavaroja metsäntutkimukseen siten, että ne tehokkaasti tukisivat valtion tiedeneuvoston tiedepoliittisen ohjelman toteutumista. Toisaalta suunnitelmaa voidaan käyttää myös ohjeena metsäntutkijoille uusien tutkimusaiheiden valintaa ajatellen.

Suunnitelman laadinnassa pidettiin lähtökohtana yleistä suunnitteluteoriaa. Tällöin keskityttiin metsäntutkimuspolitiikan normatiiviseen ja strategiseen suunnitteluun. Lähinnä relevanssipuuteknikkaa soveltamalla muodostettiin metsäntutkimuspolitiikalle yhdeksän päämäärää ja 22 laajahkoa tutkimustehtävää.

Valittujen metsäntutkimustehtävien vaikutuksia valtion tiedeneuvoston asettamaan viiteen painopistealueeseen selvitettiin yksinkertaistetulla delfitekniikalla. Tällöin kukin käytetystä kuudesta asiantuntijasta arvioi erikseen jokaisesta metsäntutkimustehtävästä, onko sillä olennaista vaikutusta johonkin mainituista viidestä painopistealueesta. »Olennaisen vaikutuksen» selvittämisessä kukin asiantuntija hahmotti tyypillisen metsäntutkimustehtävään liittyvän tutkimusprojektin ja arvioi sen toteutuksen tuottamat päätulokset ja niiden mahdollisen kanavoitumisen eri päätäntäryhmien päätösten kautta valtion tiedeneuvoston painopistealueille (liite 1). *Tällä menettelyllä todettiin kaikkien esitettyjen metsäntutkimustehtävien tukevan ainakin yhtä tiedeneuvoston painopistealuetta.* Useimmat metsäntutkimustehtävät tukevat nimenomaan väestön elinehtoihin ja ympäristönsuojeluun liittyvia painopistealueita.

Valtion tiedeneuvoston viisi painopistealuetta katsottiin keskenään samanarvoisiksi, koska ne oli esitetty ilman tärkeysjärjestystä. Tämän perusteella pääteltiin, että mitä useampaan painopistealueeseen jollakin metsäntutkimustehtävällä on vaikutuksia sitä tiedeneuvoston tiedepoliittisen ohjelman kannalta ajankohtaisempi kyseinen tutkimustehtävä on (liite 2). Tätä kriteeriä käyttäen *valittiin valtion tiedepoliittista ohjelmaa parhaiten tukevien metsäntutkimustehtävien ryhmään seuraavat* (ilman tärkeysjärjestystä):

— Metsäalan koulutustarve
— Metsien virkistyspalvelusten tuotanto, jakelu ja kulutus
— Metsätyömenetelmien inhimillisen ja ekologisen rasittavuuden keventäminen
— Metsänsuojelu eli metsätuhojen estäminen
— Metsäekosysteemin ja ympäristön väliset vuorovaikutussuhteet
— Puuntuotoksen ulkopuolinen metsäekosysteemin aineellinen tuotanto ja sen hyödyntäminen.

Edellä selostetuin perustein *valittiin valtion tiedepoliittista ohjelmaa toiseksi parhaiten tukevien metsäntutkimustehtävien ryhmään seuraavat* (ilman tärkeysjärjestystä):

- Metsäojituksen, metsänviljelyn, metsäteiden ja metsän lannoituksen ekologia ja yhteiskunnallinen edullisuus
- Maa- ja metsätaloudelle yhteisten tuotantovälineiden liiketalous ja yhteiskunnallinen edullisuus
- Metsäsysteemin aluevaikutukset (etenkin kehitysalueilla)
- Metsäsysteemin eri tuotantosuuntien tuotteiden kysynnän, tarjonnan ja hintojen ennustaminen sekä muu niihin liittyvä tulevaisuuden tutkimus
- Mittaus-, hinta- ja palkkajärjestelmien kehittäminen

Melko harvat esitetyistä metsäntutkimustehtävistä tukevat voimakkaasti demokratian ja tasaarvon toteutumista suomalaisessa yhteiskunnassa. Jos tätä painopistealuetta haluttaisiin erityisesti korostaa, *tulisi metsäverojärjestelmän kehittäminen keskeisesti esille*, koska nykyisen metsäverotuksen voidaan katsoa vahvistavan sekä alueellista että ihmisryhmien välistä eriarvoisuutta.

— *Toisaalta metsäsysteemin mahdollisuuksien tutkiminen kehitysmaiden kehittämisessä tarjoaisi Suomen kehitysyhteistyötä ajatellen huomionarvoisen keinon kansojen välisen eriarvoisuuden vähentämispyrkimyksissä.*

Appendix 1

An example of the evaluation of impacts of forest research activities on the objectives (cf. p. 7) of the Government science policy program

Forest research activity*	(1) Public health	(2) People's living conditions and development factors in the national structure of production	(3) Environmental protection and development of new production methods which save both natural resources and environment	(4) Democracy and equality in the Finnish society	(5) Working life and working conditions	Total impact
a	0	1	1	0	0	2
b	0	0	1	0	0	1
c	0	0	1	1	0	2
d	1	0	1	0	0	2
e	0	1	1	0	0	2
f	0	1	1	0	0	2
g	0	1	1	0	1	3
h	0	1	1	1	1	4
i	0	1	1	0	0	2
j	1	1	1	0	1	4
k	1	1	1	0	0	3
l	1	1	0	1	1	4
m	0	1	1	1	1	4
n	0	1	0	1	0	2
o	0	1	0	1	0	2
p	0	1	0	1	1	3
q	0	1	0	1	1	3
r	0	1	1	0	1	3
s	0	1	0	1	0	2
t	1	1	1	1	1	5
u	0	1	1	1	0	3
v	0	1	1	1	0	3

* see pp. 10—11 above

Appendix 2

The total impacts of forest research activities determined by the panel of six experts

Forest research activity*	(1) Public health	(2) People's living conditions and development factors in the national structure of production	(3) Environmental protection and development of new production methods which save both natural resources and environment	(4) Democracy and equality in the Finnish society	(5) Working life and working conditions	Total impact
t	1	6	3	5	6	21
m	5	4	1	4	6	20
k	6	4	6	4	0	20
a	6	5	6	0	2	19
d	6	3	6	2	1	18
l	3	6	3	4	2	18
h	0	6	6	2	3	17
q	1	6	1	4	5	17
u	0	6	2	6	2	16
j	2	6	2	2	3	15
p	0	5	0	4	6	15
g	1	5	6	0	2	14
n	0	6	1	4	3	14
o	0	6	4	4	0	14
r	0	6	5	1	2	14
v	0	6	2	6	0	14
c	0	2	4	5	1	12
i	0	5	5	0	1	11
b	1	3	5	0	1	10
f	0	6	4	0	0	10
e	0	6	3	0	0	9
s	0	4	0	2	1	7
Total	32	112	75	59	47	325

* see pp. 10—11 above

PALO, MATTI O.D.C. 0 - - 010 + 0 - - 062

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Key words: Forest research policy, strategic planning, science of science, relevance tree

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