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The Rationale of Decision-Making by Forest Owners

Metsänomistajien päätöksenteon perusteet

Kauko Hahtola



SUOMEN METSÄTIETEELLINEN SEURA

Suomen Metsätieteellisen Seuran julkaisusarjat

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PREFACE

THE RATIONALE OF DECISION-MAKING BY FOREST OWNERS

KAUKO HAHTOLA

SELOSTE:

*METSÄNOMISTAJIEN PÄÄTÖKSENTEON
PERUSTEET*

The English text was checked and corrected by Mr. F. A. Fawcett. The translation of the questionnaire into English was made by Mr. PAULI LEIWO.

The English translation of the empirical material was facilitated by the support I received from the CENTRAL FORESTRY BOARD, TAPIO, the FORESTRY COUNCIL OF THE CENTRAL UNION OF AGRICULTURAL PRODUCERS, the DISTRICT FORESTRY BOARDS OF PORHON-KARJALA and UUSIMAA-HÄME, and the corresponding LEAGUES OF FOREST MANAGEMENT ASSOCIATIONS. Financially, the work has been supported by the FINNISH CULTURAL FOUNDATION, and the NATIONAL RESEARCH COUNCIL FOR AGRICULTURE AND FORESTRY in its series of publications.

I wish to express my sincere gratitude to all the persons and organizations mentioned above, and to everyone who has helped me with advice, inspiring comments, and financial support.

Helsinki, February 1973

KAUKO HAHTOLA

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PREFACE

The present study — carried out in THE FORESTRY DEPARTMENT OF THE WORK EFFICIENCY ASSOCIATION (Työtehoseura) — links up with a series of investigations into the behaviour and decision making of forest owners, with the objective of reinforcing the empirical and theoretical foundations for the promotion of private, small-scale forestry. Professor MARTTI SIPILÄ, Managing Director, and Dr. MIKKO KANTOLA, Head of the Forestry Department of THE WORK EFFICIENCY ASSOCIATION, have not only provided me with very favourable working conditions, but have also read the manuscript and offered valuable advice. I am indebted to my colleague, Dr. JOUKO MÄKELÄ, for his constructive criticism and the many inspiring discussions we had throughout the progress of the study.

Many other people helped me. Discussions with Professor PÄIVIÖ RIIHINEN and Dr. VELI-PEKKA JÄRVELÄINEN have made an essential contribution to my work. Both of them also read the manuscript. Professor OLAVI RIIHINEN kindly allowed me to make use of unpublished factor scores of the social structure of Finnish communes contained in his study, which is approaching completion, and also read the manuscript. Docent TOUKO MARKKANEN perused the manuscript; both he and Mr. JORMA TORPPA, M.A., offered valuable ad-

vice on many mathematical and methodological problems. The suggestions made by Mr. ILKKA NIINILUOTO, Lic. Phil., during the closing stages of my study resulted in improvement of the presentation of the philosophical starting points.

The English text was checked and corrected by Mr. F. A. FEWSTER. The translation of the questionnaire into English was made by Mr. PAULI LEIWO.

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I wish to express my sincere gratitude to all the persons and organizations mentioned above, and to everyone who has helped me with advice, inspiring comments, and financial support.

Helsinki, February 1973

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1. PROBLEMS

The difficulties met by an extension forester and a forest owner in their search for a common language in a dialogue on forestry — experienced by the present author — constitute the most forceful impetus for this investigation (HAHTOLA 1962 a, p. 443, 450). The problem is not new in forest economics. In fact, constant discussions on the relevance of particular principles of forest management and the methods of calculation advocated by different schools of forest economy have become traditional (DICKSON 1956, pp. 60–68; HERMANSEN 1969, pp. 65–66; SAARI 1967; SPEIDEL 1967, pp. 17–21). Only during the last few years has it been realized that different ways of thought, different goals and means are in operation in the decision-making of different categories of forest owners, officials and forestry institutions, and consequently that each of the classical methods of calculation has no more than a special, limited field of proper application (HERMANSEN 1964, pp. 299–311; STREYFFERT 1956, pp. 20–25).

A parallel development is observable in general business economics. The increasingly strong approach of behavioural science — in particular the empirical studies of organizational decision-making — has led to reformulations of the theory of the firm. Decision models based upon multiple goals rather than single ones, with the attention given them being sequential rather than simultaneous, with goal-attainment that is satisfying rather than maximizing, have proved more useful in the description and explanation of the actual behaviour of firms than the classical, profit-maximizing models (COHEN and CYERT 1965, pp. 377–382; CYERT and MARCH 1963, pp. 3, 16, 35, 39, 126; JOHNSEN 1968, pp. 25–32; MARKHAM 1961, p. 88). The defects and reorientations of general business economics (cf. HOROWITZ 1970, pp. 315–339; SCHOEFFLER 1955, pp. 17–27, 82–85, 159–161) have also provoked forest economists to question the relevance and accuracy of the profit-maximizing model in depiction

of the decision-making of forest owners, and to suggest new approaches. The emphasis laid upon empirical investigations of decision-making by forest owners is a common feature of these recommendations (cf. DIETERICH 1939, pp. 30–36, 38–45; HERMANSEN 1964, pp. 309–320; 1969, pp. 66–67, 71–72; LUNDELL et al, 1969, p. 542; OPPHEIM 1971, pp. 390–391; PÄIVINÖ RIIHINEN 1963, p. 13; HAHTOLA 1965, p. 3; 1971 b, pp. 16–19).

The aim of this study is accordingly that of contributing towards bridging the »gap of language» between private forest owners and professional foresters. That presupposes the *development of more satisfactory explanatory schemes for decision-making by forest owners than the available profit-maximizing models*. In pursuance of the frequent recommendations, the theorizing in this work is based upon empirical investigations of behaviour. By focussing upon the actual decision-making of forest owners, this study strives to strengthen the empirical grounds for the development of behavioural theories in regard to the privately-owned forestry firm, relevant business-economic decision models, and proper methods for forest-economic calculation (see HAHTOLA 1971 b, pp. 7, 20). In view of the low theoretical development of this field of research, the study is mainly *explorative* — generating new hypotheses — although some former theoretical constructs will also be proved by application of the available empirical material.

In the aim of furthering a better understanding of decision-making by forest owners, this study does not analyse the rationality of forest owners' argumentation in the light of given premises. Accordingly, the logical rules, methods of calculation or heuristic devices employed in decisions, will not be treated here. The mechanisms of decision processes will also be omitted from major consideration. Instead, *the premises themselves, the rationale of decision-making* — whether they are mental or physical in nature — will be adopted as the central

focus of this study and investigated empirically, along with the previous lines of thought (cf. JÄRVELÄINEN 1971 a, p. 12; KIRSCH 1970, pp. 26, 62–64, 68; RANTANEN 1971, pp. 2–3, 21; RÖLING 1966, pp. 97–100, 104–105; SIMON 1966, p. 20).

In general, it seems that the studies concentrated on the logical steps of decision-making, or on the processes of choice are focused upon single decisions. The behaviour is then conceived as the result of the decision process. In study of the rationale

— that is, the criteria — of choice, as in this case, it is reasonable to focus upon a larger set of decisions, and think that the decision itself is a form of behaviour, a mental aspect of it (cf. MATTI KELTIKANGAS 1971, pp. 9–17; NICOSIA 1966, pp. 15–17, 142–144). *The decisions of forest owners analysed in this study concern management, cooperation and the promotion of non-corporate private forestry.* The study has been made in the Forestry Department of the Work Efficiency Association (Työtehoseura).

2. SOME BASIC COMMITMENTS

21. The Forest-Political and Scientific Relevance of Mental Variables of Forest Owners

A common rule of scientific work states that an author should try to be explicit in his commitments and basic presuppositions (NAGEL 1961, p. 489; cf. ISRAEL 1972, pp. 72–73). Thus, ever since it was convincingly demonstrated that the capacity of a single scientist to be objective and »value-free» in his scientific efforts is rather limited (MYRDAL 1957, p. 160; SARIOLA 1956, p. 80; 1961, p. 86). Apart from facilitation of scientific discussion and control, explicit formulation of the ethical and theoretical commitments of the author further assists him in the construction of a coherent methodological setting for his study (RILEY 1963, pp. 5–10, 24; see also HEISKANEN 1967, pp. 10–12).

The basic objective of this study — indicated in the introductory section — is that of achieving an understanding of ways of thinking and economic argumentation of forest owners in regard to forest management and the promotion of private non-corporate forestry. It delineates the research interests — both theoretical and forest-political — that direct the study (JUNTUNEN 1971, pp. 11–12). As is the case with other Finnish studies of the behaviour of forest owners, one of the points of departure of the presentation is the fact that privately owned, non-corporate forests predominate in Finland, comprising about 60 % of the total forest area in about 300,000 independent units, holdings under 5 hectares excluded (Metsätalastollinen vuosikirja 1970, pp. 58–59). Consequently, *the wide managerial independence* of private forest owners — despite many legal restrictions — is still an important reality in Finland when forest policy is being implemented (cf. JÄRVELÄINEN 1971 a, pp. 9–12; von MALMBORG 1967, pp. 2, 28–43; PÄRVIÖ RIIHINEN 1970, pp. 3, 5).

In close connection with the forest-political question in regard to the managerial independence of forest owners is the

philosophical aspect; *how should a man be considered, as an agent of purposive behaviour, or a passive object of environmental stimuli* (ALLARDT 1972, pp. 64–67; ISRAEL 1972, pp. 70, 78; MARKOVIĆ 1972, p. 27; TAYLOR 1964, pp. 3–4). The emphasis laid upon empirical investigations concerned with the rationale of decision-making by forest owners provides a hint of the philosophical commitments of the present writer; it is regarded as necessary to consider the inner dispositions, goals, attitudes, and other mental features of forest owners for the achievement of a correct understanding of their decision-making and behaviour (cf. OZBEKHAN 1969, pp. 78–81, 127–129; SCHEFFLER 1969, pp. 167–169).

The viewpoints presented by ALLARDT (1972) elucidate the role played by the mental variables in the explanation of human behaviour. He states that, in sociology, explanations of behaviour are mainly given in terms of either causes, habits or motives. Although in sociology most explanations by »causes» do not fulfil the requirements of causal explanation, they resemble causal explanations in the sense that they are based upon overt observations. This concerns, for instance, the inference drawn from correlations between material conditions and many forms of overt behaviour. The use of the different forms of explanation is connected with the different interpretations of social reality. Some aspects of social reality are permeated by the ideas participants have about reality, while some others can be observed independently of the ideas of the participants. The terms culture and structure can be used for distinguishing between those two aspects, the institutions constituting an intermediate category. Thus, ALLARDT (1972, pp. 54–64, 67–68) has presented the following classification of sociological explanations:

- 1) *Structural explanations*, based upon overtly observable causes
- 2) *Institutional explanations*, based partly, at least, upon the habits and traditions, which are independent of the ideas of the participants

- 3) *Cultural explanations*, based upon the ideas the participants have about the social reality, available alternatives and criteria of choice.

In regard to the structural explanations, ALLARDT states that they do not specify necessary and sufficient conditions for the occurrence of behavioural phenomena. However, they deal with some contingent limiting conditions, and exclude some possibilities. In the study of specific societies, communities and situations, the structural explanations have to be supplemented by analyses of intended, directive behaviour. The latter presupposes a study of culture, that is the cognitive and evaluative models of people. The culture provides motives, alternatives and the criteria of choice for the individuals in action. When this is applied to the behaviour of forest owners, one implication is that causal explanations based merely upon *the silvicultural state and the amount of standing timber* have to be complemented by taking into consideration *the motives and other rationale of decision making by forest owners*. The traditions and habits of forest utilization, along with the regulations prescribed by various communities and the whole of society, might provide appropriate examples of the institutional factors relevant to decision-making by forest owners. Nevertheless, room remains for the free actions, explicable only by the forest owners' predispositions, attitudes and other criteria of choice (cf. HAHTOLA 1967 b, pp. 22–26; 1971 a, pp. 12, 16–17; JOHNSTON et al. 1967, pp. 31–40; JÄRVELÄINEN 1971 a, pp. 9–11; PÄIVIÖ RIIHINEN 1963, pp. 13, 65–68).

22. The Philosophical Status of Mental Variables

221. Three Approaches to Mental Phenomena

In determination of the relevance of mental variables in explanation of the purposive behaviour of forest owners, there still remains the question of the status held by the mental variables in the explanatory schemes that form the objective. This deserves further discussion, by reason of its wide repercussions upon the methodological decisions of the study.

In the philosophy of science, discussions concerned with the different approaches to mental phenomena have mainly taken the form of *causal as opposed to teleological explanation* (BRAITHWAITE 1955, pp. 319–341; NAGEL 1961, pp. 504–546; von WRIGHT 1970, p. 1). Broadly speaking, the explanation consists in the reduction of complicated and unfamiliar systems into simpler elements, with which we are already so *familiar* that we accept them as not in need of explanation (AHMAVAARA 1970, pp. 235–236; BRAITHWAITE 1955, pp. 319–320; LUNDBERG 1946, p. 13; NAGEL 1961, p. 45). In addition to the reduction to familiar elements, the scientific explanation strives at *simplicity*, or in other words the explanation of as many empirical phenomena as possible by the smallest possible number of basic concepts and assumptions (NAGEL 1961, pp. 277–283; THURSTONE 1961, pp. 51–59). The acceptability of an explanation is thus dependent upon both its *empirical* and its *theoretical support* (cf. HEMPEL 1966, pp. 40–42).

The causal explanation dominates in the natural sciences, particularly in mathematical physics. Upon the basis of a general law, it specifies a preceding or simultaneous event A, which under stated conditions is sufficient and necessary for the occurrence of B, the event to be explained. It is essential for causal explanation that cause A and effect B are logically independent, separately identifiable and observable phenomena (ALLARDT 1972, p. 54; NAGEL 1961, pp. 32–45, 73–74; SCHEFFLER 1969, pp. 23–29).

In the behavioural and social sciences — in the explanation of purposive behaviour — *the teleological explanations* are usually preferred, although even here the general trend seems to have been towards causal explanation. In the teleological explanation, an endeavour is made to attain intellectual satisfaction by specification of the goal or result in mind, for the sake of which the event is said to occur (BRAITHWAITE 1955, pp. 320, 322–323; TAYLOR 1964, p. 6). Contrary to the empirical causal relation, the relation between an action and its result — the objective — is in general conceived to be not empirical, but conceptual, logical. Thus, the teleological approach is in reality a device for understanding and

interpretation, and not for explanation (ALLARDT 1972, pp. 55–57, 63–64).

Teleological reasoning is elucidated by the viewpoints presented by von WRIGHT (1970, pp. 21–25; 1971, pp. 108–111; 1972, pp. 39–40) in regard to the so-called *practical syllogism* and its connection with the teleological explanation. A practical syllogism is characterized by its leading to an action, viz. its conclusion is an action. The first premise states an objective, a general principle or a rule that specifies what is good for us, or what constitutes our duty. The second premise sets forth a means to the ends in question. The practical conclusion — inferred from these premises — is accordingly the use of the means to achieve the end concerned. Thus, when behaviour is explained teleologically, it is understood as an action, and a practical syllogism is construed for it. According to ALLARDT (1972, pp. 63–64), the teleological explanation in the form of a practical syllogism is a prototype of cultural explanation.

Mention is due of one characteristic of the teleological explanation as a device for understanding and interpretation. The interpretation often proceeds *hermeneutically*. For example, the existence of an objective is inferred from the features of behaviour, and the behaviour is in turn understood upon the basis of this stated objective. Thus, in the teleological interpretation the whole picture of the behaviour is emphasized, rather than the details (ALLARDT 1969 a, pp. 17–19; MEHTONEN 1970, p. 4; von WRIGHT 1971, p. 109).

The extreme proponents of the causal explanation — with man regarded as a thing-like object — represent the first approach to mental phenomena. They strive to exclude the intentional mental variables from scientific dialogue, and *reduce teleological explanations to causal laws* (cf. LAGERSPETZ 1959, p. 4; NAGEL 1961, pp. 398, 419, 448; SEPPÄNEN 1964, pp. 1021–1022). Another strategy preserves *separate realms of phenomena for causal and teleological explanations*, and stresses either the distinctive character of physical and mental phenomena, or the different philosophical status of causal and teleological explanations (MARKOVIĆ 1972, p. 27; TAYLOR 1964, pp. 54–62; von WRIGHT

1966 a; 1966 b). The third approach in dealing with mental phenomena is characterized by the *equal philosophical status of physical and mental variables and their inclusion in the same theoretical constructs*, as, for example, in cybernetics. This also leads to the unification of causal and teleological explanations (cf. AHMAVAARA 1970, p. 166; ALLARDT 1972, pp. 66–67; JOHNSEN 1968, pp. 42–44, 382–383, 471; MARKOVIĆ 1972, pp. 36–28; NICOSIA 1966, pp. 142–146; OZBEKHAN 1969, pp. 97–100; PULLIAINEN 1967, pp. 12–20).

These alternative approaches to mental phenomena are discussed in the following chapters. The aim of this presentation is not that of offering a representative review or treatise in respect of the part of philosophy of science concerned, but is restricted to delineation of the writer's philosophical points of departure.

222. The Reduction of Mental Phenomena to Deterministic Causal Laws

This discussion is first focused upon some viewpoints presented by the proponents of reductionist strategies in favour of the causal explanation as an ideal form of cognitive control of even purposive behaviour (ISRAEL 1972, p. 79; SEPPÄNEN 1964, pp. 1021–1022). The superiority of the causal explanation has been claimed — and also challenged — in the following aspects in particular: 1) *unity of science*, 2) *predictive power*, and 3) *objectivity*.

1) The application of causal explanation and the reductionist strategies is often advocated with a view to accomplishing the *unity of science* and the reducibility of one branch of science to another (see HEISKANEN 1967, p. 23; LAGERSPETZ 1959, p. 6). The unity of science, arranged in accordance with *the ideals of mathematical physics* forms a main tenet of the positivistic philosophy of science (NIINILUOTO, 1971, pp. 39–40; von WRIGHT 1970, pp. 2–3). Nonetheless, although the unity of science may be attainable, the confidence in its utility seems to be diminishing. Reliance upon a single, uniform research strategy that stipulates a special type of state-descriptions of empirical phenomena, and a special type of theoretical constructs,

may become an obstacle to theoretical invention and discovery. Even in physics, with a tradition of deterministic, mechanistic models — prototypes of causal explanation — being used exclusively, the experience gained from the quantum theory has demonstrated the usefulness of alternative approaches (KAUFFMANN 1944, p. 74; NAGEL 1961, pp. 278, 323–324, 445). The behaviouristic, stimulus-response approach in psychology, and the simplifying assumptions of economic theories in respect of the market structures and the rationality and preferences of economic agents, may provide the best acknowledged ways for the facilitation of causal explanation in the behavioural sciences (NAGEL 1961, pp. 508–509, 543; NICOSIA 1966, pp. 49, 53–54, 62–63, 70; RÖLING 1966, pp. 104–105; TAYLOR 1964, pp. 106, 152–160). The inadequacy of this approach in explanation of decision-making by forest owners constitutes one point of departure in this study.

2) It is also claimed that in the causal explanation the antecedent event is a *sufficient* — not only necessary — condition for occurrence of the postcedent event. Whenever the alleged cause occurs so does the alleged effect. Consequently, the causal laws can be used for *prediction* — contrary to teleological laws, which define only *the necessary conditions* (LAGERSPETZ 1959 pp. 6, 34, 66–67; NAGEL 1961, p. 94; TUOMELA 1966, p. 186; cf. VON WRIGHT 1966 a, pp. 15–16).

However, the determinism implied in the previous statements — proposed as the prerequisite for prediction — obtains only in respect to *the special set of properties* (state variables) and *the ideal conditions* specified by some accepted causal theory, confirmable only under experimental conditions. Furthermore, although the theoretical concepts of the deterministic causal theory may be expressed with a high degree of precision, the rules of correspondence that coordinate them with experimental ideas are far less definite. In particular in the behavioural and social sciences, the use of deterministic theories is also handicapped by the lack of opportunities for experimentation, and by the difficulties involved in the application of ideal-case predictions to empirical reality (AHMAVAARA

1970, pp. 14–16, 224; ALLARDT 1969 a, pp. 11–12; LUNDBERG 1939, pp. 115, 140; NAGEL 1961, pp. 97, 278–283, 293, 508–509; TAYLOR 1964, p. 111). Thus, instead of the sufficient condition — the deterministic cause — which according to SCHEFFLER (1969, p. 23) means the sum total of conditions taken together, both positive and negative, the behavioural sciences generally operate with necessary and limiting conditions (ALLARDT 1972 pp. 61, 67–68).

It seems reasonable to assume, in factual decision situations, that also predictions based upon laws that are weaker than deterministic are used as rationale, with the prediction conceived here taking the form of an expectation, anticipation, forecast, and so on (COLEMAN 1964, pp. 52–53; SCHEFFLER 1969, p. 46). Consequently the sharp distinction of causal and teleological explanations on the foundation of their applicability in prediction seems untenable. It should be observed, however, that when the teleological relation is taken as being purely conceptual, the prediction presupposes the addition of an *independently identifiable and observable* epistemic state, belief, desire, etc. to the predicting premises (ALLARDT 1972, pp. 54–56; LAGERSPETZ 1959, p. 20; TUOMELA 1966, pp. 186–187; VON WRIGHT 1966 a, pp. 18–23; 1966 b, pp. 184–185; 1972, pp. 49–51).

The priority claimed for the causal explanation by reason of its offering stronger grounds for prediction is also questionable on application of the viewpoints presented by SCHEFFLER (1969, pp. 23, 25, 46–55). He has stated that neither the prediction nor the explanation represents the central purpose of science. Instead, science is primarily directed toward the construction of a simple network of true general principles, *a deductive pattern*, which relates events one to the other. Such a network, together with other information, would allow of a wide variety of arguments, of which explanation and prediction might be regarded as special forms. Explanation is thus a sub-type of *substantiation*, an argumentation in which the conclusion is given, and the premises deduced. Prediction, accordingly, forms a subtype of *position*, in which the premises are given, and the conclusion deduced. Since matters of re-

sponsibility and control are of great practical importance, the explanation that defines the antecedent cause of an event, and the prediction of a postcedent event upon the foundation of an antecedent one, have been given a very great deal of consideration. Against this, the theoretical importance of teleological-type explanations might often have been underestimated, as they have a different temporal order, and accordingly can be conceived as substantiations, but not readily as explanations (see also AHMAVAARA 1970, pp. 28–36; HEMPEL 1952, p. 20; LUNDBERG 1946, pp. 11–13).

3) The third merit frequently attributed to causal explanation is the supreme *objectivity*. Notwithstanding the ambiguity of the concept «objectivity», the discussion on this argument may illustrate some crucial philosophical and methodological problems. According to LUNDBERG (1939, p. 22):

«Things which all or nearly all men respond to in very much the same way, i.e. iron fence, we call relatively objective, physical, material, tangible etc. Things to which only relatively few, or only one, respond in the same way without special cultural conditioning are termed subjective, intangible, spiritual, etc.» (cf. LUNDBERG 1939, pp. 9, 25).

Indeed, some kind of objectivity — generality in responses — in regard to scientific inquiry and communication is necessary for the cumulation of science. LUNDBERG's characterization of the objectivity also provides a hint of the ways in which the proponents of causal explanation think objective knowledge could be achieved. Their ideals of scientific inquiry come from the natural sciences. According to the oldest view, the *ontological causal order of nature* detectable by empirical observation forms the utmost basis of all objective knowledge (cf. BLALOCK 1964, pp. 9–22; KAUFMANN 1944, pp. 81, 92; NAGEL 1961, p. 277; SARIOLA 1961, pp. 37, 41; SCHEFFLER 1969, pp. 23–24; von WRIGHT 1970, pp. 16–18). After the conception of the universal causal order had been rejected, the *theoretically-neutral data language* was assumed to be an ultimate criterion and basis for all relevant theoretical constructs (APEL 1972, p. 8; KAUFMANN 1944, pp. 195–196; NIINILUOTO 1970, p. 7; SCHEFFLER 1969, pp. 155–157; TAYLOR 1964, pp. 72–75, 91–92).

Even the more moderate, still prevailing positivism holds that objective relevant knowledge is limited to *observable facts and inductive inferences based upon them* (NIINILUOTO 1971, pp. 39–40; von WRIGHT 1970, pp. 2–4). On occasion, the ideals of exact, natural sciences have even led to the conception that *the mathematical form of a theory* constitutes a proof of the objectivity and accuracy of the causal interpretations implied by the theory. The teleological explanations by purpose, intention, motive, and so on, are, in turn, seen as introducing animistic and metaphysical elements in discussion, unacceptable in science (KAUFMANN 1944, pp. 89, 123, 148, 175, 241; LUNDBERG 1939, pp. 9, 22; 1946, p. 40; RAJAVUORI 1970, p. 7; von WRIGHT 1966 b, p. 184; TAYLOR 1964, p. 93).

In advocating the reductionist strategy and the natural science methodology even for behavioural phenomena LUNDBERG (1946, p. 23) states:

«Such words as qualitative, measurable, objective, complex, homogeneous, etc., must be regarded under the postulates on which science proceeds, not as inherent characteristics of data but as designations of certain ways of responding and communicating responses.»

Accordingly, behind distinctions such as objective-subjective, sense-nonsense and scientific-metaphysical lie *the basic suppositions of the theories in question* (ISRAEL 1972, pp. 70–74; JUNTUNEN 1971, pp. 16–18; SCHEFFLER 1969, pp. 127–129).

AHMAVAARA (1970, pp. 19–24) has pointed out that some research strategies, with a special set of conventions and presuppositions, have at times been canonized by the philosophy of science, on the foundation of their successful application in some branch of science. These *paradigmatic conventions* — even when based on ancient, obsolete practice — have then been utilized as demarcators of relevant phenomena and the proper scientific procedure. Thus, the basic presuppositions of the positivistic strategies of science have only recently been more generally discussed, and a more serious challenge made to their neutrality and usefulness as a paradigm for the behavioural sciences (see also APEL 1972, p. 7; ISRAEL 1972, pp. 81–82; JUNTUNEN 1971, p. 11; MARKOVIĆ, 1972 pp. 27–28).

In regard to the possibilities of the reduction, SCHEFFLER (1969, pp. 122–123) has adopted the attitude that some kinds of teleological explanations are — at least in principle — assimilable to the category of causal explanations. Thus, for example, purposive cases can be interpreted as purporting to explain behaviour by reference to antecedent goal-ideas concerning the future (cf. APEL 1972, pp. 18–19; DUBOS 1969, p. 165; OZBEKHAN 1969, pp. 128–130; SHACKLE 1961, p. 273). One crucial prerequisite for such assimilation is the independent empirical content of these goal-ideas (SCHEFFLER 1969, pp. 29, 127, 225; TUOMELA 1966, pp. 186–187).

223. Separate Realms of Mental and Physical Phenomena

The starting point taken for the second way of orientation towards mental phenomena is *the irreducibility of mental and physical phenomena to one another* (see AHMAVAARA 1970, pp. 250–253; KAUFMANN 1944, p. 241; TAYLOR 1964, pp. 55, 93). According to the most extreme form of this thesis, the physical and the psychical differ essentially, and do not interact. For instance, the distinctive features of mental phenomena are referred to their intentionality, uniqueness and holism (KAUFMANN 1944, p. 123; SCHEFFLER 1969, p. 78; TAYLOR 1964, pp. 8–12; cf. TUOMELA 1966, p. 187).

Consequently, this view indicates that *basically different methods of scientific control must be applied to these two realms*. Only the teleological type of explanation is applicable to mental phenomena, which can not be subsumed under causal laws. Moreover, stress is laid upon the distinctive differences of causal and teleological explanations, and by definition the use of teleological concepts — such as intention, purpose and motive — is restricted to the field of conceptual analysis (ALLARDT 1969 a, pp. 17–19; KAUFMANN 1944, pp. 132–133, 138; TAYLOR 1964, pp. 8–9; TUOMELA 1966, p. 187; von WRIGHT 1966 b, p. 184). According to this reasoning, teleological and causal analyses serving the purposes of different interests of research — understanding as opposed to explanation — are not alternative or competitive systems, but comple-

mentary ones. The conceptual, teleological type of analysis, resulting in understanding, is regarded as a necessary prerequisite, *a priori*, of causal explanation in the social and behavioural sciences (APEL 1972, pp. 21–26; von WRIGHT 1971, pp. 109–111).

The separation of mental and physical phenomena further includes the following important corollaries: *the strict separation of values and facts*, and the special philosophical status of values. Values are conceived as either subjective individual preferences or as voluntary conventions. They are empirically observable and describable, but are not legitimized by objective facts (cf. AHMAVAARA 1970, pp. 12–15, 28–31, 35–36; HINTIKKA 1972, p. 16; JUNTUNEN 1971, pp. 13–15; OZBEKHAN 1969, pp. 71–76).

The irreducibility of mental and physical phenomena, and the thesis — sometimes entitled HUME's quillotine — that *values cannot be legitimized by facts and consequently not by empirical observations*, are quite generally accepted among social scientists. However, the conception of the non-interactionism of mental and physical phenomena often seems to be abandoned in sociological practice (HINTIKKA 1972, p. 16; JUNTUNEN 1971, pp. 13–15; KAUFMANN 1944, pp. 141, 208). The interrelations of mental and physical variables are not only the frequent subject of study, but as a rule the interpretations based upon them — like other relationships of different-type phenomena — have high informative value. This applies to both causal and interpretative, teleological type analysis. However, in speaking of causal relations between mental and physical variables in the behavioural and social sciences, the causality is conceived in a non-deterministic, probabilistic, way, thereby diminishing the differences of causal and teleological explanations (AHMAVAARA 1970, pp. 223–236; ALLARDT 1969a, pp. 11–12, 16–19; 1969 b, pp. 48–51; HEISKANEN 1967, pp. 24–32; NIINILUOTO 1972, pp. 147–148; KUUSI 1962, pp. 16–17).

224. The Unity of Mental and Physical Phenomena

The third basically different approach to mental phenomena is offered by cyber-

netics and system-theoretical thinking in general. The mental phenomena — purposive behaviour and value judgements included — can then be taken as relevant, important objects of the social and behavioural sciences. No attempt is made to reduce them to non-intentional, material phenomena. Moreover, no stipulation is made on the separate realms of mental and physical events. The crucial point of this approach consists in the supposition of a *material, observable basis for all purposive mental processes*, that is the unity of mental and physical phenomena (AHMAVAARA 1970, pp. 12–14, 249; ALLARDT 1972, pp. 64–67; JUNTUNEN 1971, pp. 15–18). Even the relation of purposive behaviour and its result is conceived as *empirical and not as purely conceptual*. The central philosophical difference of causal and teleological explanations thus disappears (AHMAVAARA 1970, p. 166; OZBEKHAN 1969, p. 77; TUOMELA 1966, pp. 186–187; von WRIGHT 1966 a, pp. 11–13, 18–23; 1966 b, p. 184).

How then does the material basis offered by this approach differ from that of mental phenomena implied by the causal reductionists described before? Instead of reduction of the intentional total processes to non-intentional elements, the cybernetic approach according to AHMAVAARA (1970, pp. 249–250) is focused upon the working and on the functional linkages of these systems. The reductionist and the cybernetist thus have different kinds of observable fact as material basis for their theories. The fact of the former refers to *independent elements*, and the fact of the latter to the *whole intentional system* (AHMAVAARA 1970, pp. 32–34; OZBEKHAN 1969, p. 145; RUSSEL 1969, pp. 145–148; see von WRIGHT 1970, pp. 14, 18–19; TOLONEN 1971, p. 4). The holistic features of intentional processes — often found to be problematic in scientific inquiry — are thus explicitly included in the presuppositions of the cybernetic and system-theoretical approach to mental phenomena (JAHNUKAINEN 1966, pp. 43–45; LUNDBERG 1939, p. 460; NAGEL 1961, p. 432; NIINILUOTO 1972, pp. 140–141; TAYLOR 1964, pp. 12, 16, 152). Furthermore, as the social total processes — according to this view the most essential objects of social sciences — are not amenable to experiment,

in these sciences the theory construction must be based upon systematic investigation of the uncertain data and weak causal relations implied in everyday experience. The positive and experimental data are mainly concerned with the unessential, trivial details (AHMAVAARA 1970, pp. 16–18, 223–226, 234–236).

The cybernetic model with its inbuilt intentionality and equal philosophical status of mental and physical variables — as outlined above — is conceivable either as a *formal or a mechanistic model* of human behaviour and decision-making. As a *formal model*, it does not suggest an obligatory primarity either to mental or to physical environmental variables in the explanation of behaviour. Values — that is, the desired states of affairs — and the social reality are considered to be interwoven, allowing of both an idealistic and a materialistic interpretation of the model (cf. AHMAVAARA 1957, pp. 14–18; 1970, pp. 150–151; JUNTUNEN 1971, pp. 15–16; NIINILUOTO 1970, p. 7). In the *idealistic interpretation*, the teleological aspects of behaviour are emphasized, and consequently the elements of the cybernetic model are considered to form a scheme that resembles a practical syllogism. If the *materialistic viewpoint* is taken, the main attention is devoted to the physical, environmental conditions of behaviour, and to the mechanistic, causal linkages of the cybernetic model (cf. von WRIGHT 1970, pp. 14, 18–19, 22–23). The research strategy preferred, for instance, by AHMAVAARA (1970, pp. 224–253) aims at the building of *mechanistic cybernetic models* of individual and social behaviour, and of the development of societies based upon neurophysiology and the materialistic Marxist theories of social phenomena (see also NIINILUOTO 1971, pp. 42–43; von WRIGHT 1970, pp. 26–27).

By the application of cybernetic reasoning, AHMAVAARA (1970, pp. 13–16, 117) has maintained *equivalence of the logical status of ideologies and scientific theories*. They are both rational generalizations based upon *everyday experience*. As they are components in the same cybernetic system, the social values forming an ideology, and the goals deduced from them, are continuously checked by experience. Consequently, the values

can be — at least partly — legitimized, that is, inferences can be drawn from empirical observations of *how things ought to be* (see also JUNTUNEN 1971, pp. 13–18; OZBEKHAN 1969, pp. 77–78).

23. The Research Strategy of the Study

The interests of research and the philosophical commitments relating to the mental variables of forest owners discussed in the previous chapters delineate the research strategy of this study. To understand the ways of thinking of forest owners in forestry matters, it seems necessary to carry out an empirical investigation of their mental variables. The rationale of their decision-making will be *empirically investigated, not merely assumed* (NICOSIA 1966, p. 70; RÖLING 1966, p. 98). To the present author, in the light of the viewpoints presented, the most promising approach in this area seems to be provided by *the equal philosophical status of mental and physical phenomena* — characteristic of system-theoretical and cybernetic thinking — in analysis of the purposive behaviour.

The holism implied in system-theoretical thinking is also a feature emphasized in the research strategy chosen. In explanation of the purposive behaviour of forest owners, the central focus is represented by the total processes and situations, and not their mental or physical details. Accordingly, both causal and teleological explanations are conceived as subordinate details or special aspects of the whole explanatory scheme. Furthermore, *the hermeneutic approach*, proceeding in a circle from details to the totality, and the contrary, is supposed to be fruitful both in framing and in interpreting these total patterns of behaviour (cf. SARIOLA 1961, pp. 46–48).

Although the construction of exact mechanistic models of behaviour and decision-making may be quite practicable, the author holds the opinion — in line with the view-

points presented by AHMAVAARA (1957, 1958) in his earlier works — that *the formal approach to mental phenomena* might be the most appropriate at this stage (see NIINILUOTO 1970, p. 7; 1971, pp. 42–43). The choice between materialistic and idealistic interpretations of the formal models of behaviour can then be left for study on the basis of *the empirical material*, and the state of development of the different *subject matter theories*. More specifically, both the value-systems and the environmental conditions — the state of forestry included — are applicable in explanation of the decision-making of forest owners (cf. MC MAHON 1964, p. 21; WILSON and NYE 1966, pp. 3–4).

In an endeavour to make an explicit statement of the philosophical conceptions that have influenced the theoretical and methodological setting of this study, another aspect is still worthy of consideration. The most essential features of the outlined research strategy — the emphasis upon mental variables, the attempts to formulate holistic theoretical constructs and interpretations, and the use of formal methods with a flexible, unorthodox position in respect to the inner mechanisms and different forms of explanation of the subject matter theories — are practically the same as those presented in earlier works (HAHTOLA 1967 a, pp. 44–45; 1971 c, pp. 255–257) as arguments for the choice of factor analysis. Thus, the method of analysis aimed at, *explorative factor analysis*, may have influenced the *philosophical commitments* of this study, and conversely. It is, indeed, outside my scope to specify the primarity of my basic philosophical conceptions, and my acquaintance with the factor analytical approach (cf. HEISKANEN 1967, pp. 10–12).

Consequently, the philosophical positions adopted in the preceding chapters can be conceived either as a priori for the methodological decisions of this study, or as a prerequisite of the use of explorative factor analysis.

3. THEORETICAL FRAMEWORK OF DECISION-MAKING BY FOREST OWNERS

31. Idealistic and Materialistic Aspects of Decision-Making

Before further steps are directed towards empirical analysis of the rationale of decision-making by forest owners, a more specific conceptualization of the subject matter is necessary (cf. WHYTE 1969, pp. 87–89).

By virtue of the philosophical commitments, and the research strategy chosen, it was unnecessary to determine either an idealistic or a materialistic view of decision-making or its rationale. The idealistic conception of human behaviour emphasizes *the free will of man and the guided, planned change of his environment*. According to the materialistic view, the mental properties of man are also determined by his *material or social environment*, which in turn changes in accordance with *the objective laws of nature and society*, independent of the individual will (AHMAVAARA 1972, p. 33; ALLARDT 1972, pp. 64–67; HINTIKKA 1972, p. 16; KUNKEL 1967, pp. 16–17, 21, 28). Both of these approaches to decision-making are thus usable in constructing the theoretical framework of the study. In fact, it was considered useful to apply *both an idealistic and a materialistic frame of reference* to direct the choice of variables, and interpretations of the empirical findings (cf. LOOMIS and LOOMIS 1961, pp. 594–595).

The traditional theory of the *profit-maximizing firm* and the *new behavioural theories of the firm* represent the *idealistic* approach to decision-making. Although the stipulated rationality in the traditional economic theory strictly limits the acceptable alternatives, both of these theories of the firm emphasize the mental variables, the free individual will, and the subjective or psychological features of the decision-making. In particular, the behavioural theories — described briefly in chapter 321 — focus in detail upon the mental processes of decision-making (SHACKLE 1961, pp. IX, 26–28, 43; SIMON 1968, pp. 1–4, 25–26).

The hierarchical structure of decision-making is characteristic of the schemes of NICOSIA (1966) and OZBEKHAN (1969), pre-

sented in chapter 322. These schemes — concentrating upon the mental variables and states of the decision-maker — can also be characterized as *idealistic*, notwithstanding the emphasis laid upon sociological variables being greater than is the case in the previous frameworks. Furthermore, OZBEKHAN's planning terminology is clearly oriented towards «the willed future», and guided change of environment.

The third conceptual scheme presented in chapter 33 is based upon *the theory of cumulative growth and regional differentiation* originating in MYRDAL (1957). This point of departure is widely used in Finnish ecological studies of regional differentiation (OLAVI RIIHINEN 1965 a, 1965 b), and also in the studies of forest owners' behaviour (HAHTOLA 1967 b; MÄKELÄ 1968, PÄIVIÖ RIIHINEN 1963 and 1970). Although this approach emphasizes the interaction of social and economic phenomena, it has many *materialistic* features. Thus, the value-systems and other criteria of choice of the individuals are mainly determined by the material conditions of the environment. The development and differentiation of the economic and social environments, in turn, seem to proceed un-guided as an inevitable concomitant of the ongoing process of industrialization (ALLARDT 1972, pp. 66–67; OZBEKHAN 1969, pp. 56–64, 88–90).

The materialistic orientation of Finnish studies of forest owners' behaviour can be realized not only in the material basis of the scheme of regional differentiation, but also in the frequent emphasis laid upon the fertility of soil, and other material conditions of the individual farms, in the explanation of forestry behaviour (cf. HAHTOLA 1967 a, pp. 163–166; JÄRVELÄINEN 1971 a, pp. 54–72; PÄIVIÖ RIIHINEN 1963, pp. 64–67).

32. Mental Processes and Levels of Decision-Making

321. Reformulations of the Theory of the Firm

In choice of the mental variables as starting points in the conceptualization of deci-

sion-making, the increased knowledge and the new lines of thought created by the empirical studies of managerial decision-making are of some interest to this study. The reformulations of the traditional theory of the profit-maximizing firm have mainly been concerned with the following points:

- 1) It has been realized that multiple rather than single goals direct managerial decision-making.
- 2) However, the capacity of human comprehension to deal with complex information has proved quite limited.
- 3) Consequently, it has been assumed that the ways of simplifying the complex decision situations constitute a crucial point, both in practical decision-making and in theory construction.

The recent studies of organizational decision-making indicate that *profit maximization is only one element* of the broad objective of business firms, although a very important one on a short-term basis (HÅLLSTEN 1966, p. 12; RANTANEN 1971, pp. 2-3, 47-48). Targets such as survival, growth, and social acceptance are also essential criteria, especially in long-term decisions. Accordingly, the individuals engaged in these organizations pursue not only salary, but also such aims as security, status, power, prestige and professional excellence (COHEN and CYERT 1965, pp. 377-382; CYERT and MARCH 1963, pp. 9, 41-42, 113; JOHNSEN 1968, pp. 28-30, 59-72, 111-115, 125, 239). In regard to forest owners, the following aims are among those mentioned: income from the use of labour and capital, employment of labour and machinery, liquidity and economic security, profitability, recreation and other imponderable objectives (see HAHTOLA 1969 a, pp. 268-269; HERMANSEN 1969, pp. 66-67; JÖRGENSEN 1969 a, pp. 39-46; 1969 b, p. 59; KANTOLA 1967, p. 5).

Moreover, empirical studies of actual decision-making have shown that, in general, the decision-makers do not possess the necessary information on possible decision alternatives, or the capacity to construct and to maximize the multiple-goal criterium function that represents their all-relevant decision variables. Instead of maximizing something, the actual decision-makers are only capable of *searching for satisfactory*

alternatives. The decision model based upon satisfying behaviour is also better than the maximizing model for application to organizational decision-making. When the owners, managers, other personnel and financiers participate in decision-making in some way or other, a maximal solution for everybody does not exist at all. The concepts of satisfying and the level of aspiration are closely related in the behavioural theories of the firm. The aspiration level, affected by past experiences, expectations for the future, the achievements of other firms, and the social environment, determine the satisfactory levels in relation to each goal (cf. RANTANEN 1971, pp. 36-39; SIMON 1968, pp. 9-11, 19-20; TAYLOR 1965, pp. 35-40).

Other mechanisms exist for reduction of the complexity of multiobjective decision situations, and for bringing them into closer harmony with the limitations of human comprehension. Indeed, as a rule only a few decision variables are considered in turn in organizational and individual decision-making. Standard operating procedures and routines, and sequential attention to goals, are characteristic of organizational decisions (COHEN and CYERT 1965, p. 326; CYERT and MARCH 1963, pp. 35-39; JOHNSEN 1968, p. 549). Habits and social norms reduce the considered alternatives in the individual decision-making (JOHNSEN 1968, pp. 324-325; KIRSCH 1970, p. 75; PETRINI 1964, p. 156; SIMON 1965, pp. 16-18). A further possible means of mastering the complex decision situations is that of always focusing attention upon the necessary first move only, and postponing the other decisions (COHEN and CYERT 1965, pp. 313, 326; KIRSCH 1970, pp. 88-92; OPPHEIM 1971, pp. 384-386).

322. Normative, Strategic and Operational Decisions

The purpose of this study, and the research strategy chosen, do not presuppose a detailed description of the decision-making process. A simple, formal model of decision-making is adequate. In consideration of the decision-making process as a structure of related simple decisions — as in the behavioural theories of the firm — it appears practicable

to connect the ideas of the multiple goals and the limited capacities of the human mind. According to KATZ and KAHN (cf. JOHNSEN 1968, p. 224) decision-making in organizations can be considered in terms of three basic dimensions: 1) the level of generality or abstraction of the decision, 2) the amount of internal and external organization space affected by the decision, and 3) the length of time for which the decision will hold. Thus, every decision does not need to be intricate, despite the complexity of the decision process as a whole. The wide scope of a decision in one dimension may be compensated by simplicity and abstraction in another respect. The extending time-horizon, for example, reduces the details of the decision (LANGHOLM 1964, p. 25).

Still further opportunities for the simplification of decision situations are afforded by arrangement of the simple decision elements into a *hierarchical structure*, for example, means-end schemes of the goals. This is a common feature for many conceptual schemes of the field (DUERR 1960, pp. 52–54; JOHNSEN 1968, pp. 65, 421, 549; LANGHOLM 1964, p. 30; NICOSIA 1966, pp. 15–17, 134–136, 142). NICOSIA (1966, pp. 120–123) considers the consumer decision process as a hierarchical system of the decision-maker's internal states:

«The three phases picture the process at three different times. At time one, the picture consists of variables internal to the consumer, which we shall call *predispositions*. The next picture consists of internal variables which we shall refer to as *attitudes*. Finally, the last shows internal variables which we shall name *motivations*. When we say that the process moves from predispositions through attitudes to motivations, we mean that the state of the consumer's world is changing in two ways. First he is moving from a passive state to a state where he is increasingly motivated to buy. Second, he is progressively narrowing the number and types of means (products and brands) from which to choose; for example, he is moving from the general decision to buy a car to the specific decision to buy a certain make and model, with certain optional equipment, and so forth.»

In analogy with NICOSIA's «funnel scheme», many authors conceptualize the decision-making as a system of policy, strategic and operational decisions (CYERT and MARCH 1963, pp. 19, 39, 102; NICOSIA 1966, pp. 122–123). OZBEKHAN's (1969, pp. 132–

135) presentation of the hierarchy of the three levels of planning is taken in this study as the main point of departure for the idealistic approach to forest-owners' decision making. He defines planning as a future-directed decision process, which is undertaken for the purpose of effecting changes in the environment (p. 152).

«Plan» refers to an integrative hierarchically organized action construct in which various kinds of decisions are functionally ordered. There are three levels of functional relations between a plan and the environment:

- a) *policy-making functions* which result in *normative* planning and are directed toward the search and establishment of new norms that will help define those values which will be more consonant with the problematic environment. In other words, normative planning occurs when the purpose of planning action is to change the value system in order to achieve the required consonance with the environment. The statements of normative planning are derived from values and defined in terms of oughts.
- b) *goal-setting functions* which result in *strategic* plans wherein alternative ways of attaining the objectives of the normative plan are reduced to those goals which can be achieved given the range of feasibilities involved and the optimum allocation of available resources.
- c) *administrative functions* which lead to *operational* planning wherein the strategies that will be implemented are ordered in terms of the priorities, schedules, etc., that the situation dictates. Operational planning is that part of the planning structure in terms of which changes in the environment are effected that are purely of a problem-solving nature. (In other words, operational planning need not involve a consideration of value premises.) (OZBEKHAN 1969, p. 153)

According to OZBEKHAN (1969, pp. 93–97, 132–135, 152), the driving impetus for and the meaning of the lower level decisions and of the whole system come from the highest, normative level of decision-making. The crucial prerequisite for the organized progressive changes in the environment is the perception of a situation as problematical, in need of solutions. Since the perception of the present situation and the desired state of affairs — the willed future — is a function of a given value system, only changes in the overall configuration of values can fundamentally change the present situation (cf. JOHNSEN 1968, p. 344; JUNTUNEN 1971, pp. 15–16; RANTANEN 1971, p. 10).

The schemes of decision-making put for-

farming — defined by factor analysis of the South Karelian data — were named as follows: 1) degree of industrialization, 2) its effects of equalization and spread, 3) family farming, 4) centralized agriculture, 5) »problem farms», and 6) traditional big-farming (HAHTOLA 1967 b, p. 63). On the basis of theoretical reasoning, and the preliminary results obtained from the material used in this study, I have later reformulated this six-dimensional scheme into the form presented in fig. 1. (HAHTOLA 1970 a, pp. 226—229; 1971 a, pp. 109—118), with a view to giving it an interpretation more strictly connected with the theory of regional differentiation.

The special characteristics of forestry and agriculture offer some theoretical grounds for this typology and the relevance of regional conditions. As branches of primary production, they cannot take part in the regional concentration to the same degree as industry and commerce. As they are fixed in location, they are accordingly carried out under varying environmental conditions, although for the main part in the areas of the depressive and spread effects, external to the actual expanding centres of population. Another characteristic of farming is its dependence upon the natural conditions determined by climate and the fertility of the soil. In combination, these two factors — the regional differentiation of socio-economic environment, and the varying natural features — give a strong local impression to farming and its preconditions (DIETERICH 1939, pp. 30—32, 62—162; HAHTOLA 1970 a, pp. 226—227; 1971 a, pp. 109—111).

Fig. 1. classifies the natural and socio-economic conditions of farming in to three main regions, I) *depressed regions with backwash effects*, II) *optimum regions for farming*, and III) *regions with expansive and spread effects*. Each of these has further been divided into two subgroups, according to population press or density. In respect of the depressed regions, it is often meaningful to speak of the population press. In the case of expansion, the density of population may be a more suitable concept (cf. CLARK 1967, pp. 59—61, 279—284). For the optimum regions of farming, the village settlement and the scattered settlement offer a

suitable basis for classification, corresponding to the density of population.

In reference to Finnish conditions, the following characteristics are attributable to these six types of farming and environmental conditions (HAHTOLA 1967 b, pp. 63—65; 1970 a, pp. 227—229; 1971 a, pp. 111—118).

332. Depressed Regions with Backwash Effects

The general features of the *agricultural problem areas* (fig. 1, p. 20) are well known: a low stage of industrialization, scarcity of cultivable land, high fertility, unemployment, with social restraints preventing migration, and as a consequence the high population pressure and the predomination of small-scale farming. The small acreage of cultivable land is partly compensated by the high ratio of forest area to the total, and the subsidiaries — in particular forest work — where available. Economic activity is further handicapped by the emigration of capital and the most active and educated part of the population, the low level of aspiration, and the social norms that favour traditional methods and oppose innovations. The conditions of forestry are rather poor. Overcutting is general. Both the sufficient resources for, and the interest in long-term silvicultural investments are lacking, since such *investments are in competition with necessary living costs*.

As a result of the advancing industrialization of society, the migration from these regions has been increased, and the population pressure has diminished. The ownership of many farms is changing; this augments the opportunities to enlarge farm units. However, absentee ownership — in particular that of wooded areas — is increasing. By reason of the declining labour force, and the low activity of economic life, it can be supposed that labour-intensive small-scale farming will diminish, and the features of *extensive farming* be strengthened in the depressed regions.

333. Optimum Regions for Farming

It is assumed that the optimum regions for farming (fig. 1, p. 20) are to be found in the intermediate zones, where neither

the depressive factors of remote regions, nor keen competition with other occupations, typical of expansive regions, is hampering primary production. These regional ideal types are also characterized by the favourable natural conditions for farming, an adequate level of local communal services, and a social environment that favours farming. In combination, these conditions, and the substantial lack of opportunities outside farming, impel *effective utilization of the opportunities for achievement offered by farming*. In these circumstances, *forestry is in competition for investments, particularly with other branches of farming*. In the main, accordingly, the conditions of forestry are determined by the status of forestry in the farm unit. In this respect, the areas of village and of scattered settlements differ substantially one from the other.

In Finland, *the village settlement* is typical of regions with wide homogeneous arable areas, and good conditions for field (cereal) crops. In general, the ratio of forest land to total acreage is small. It is also characteristic of a village settlement that the tree stands are usually located far away from the farm centre, and have an unfavourable, long and narrow shape. These circumstances impede the use of the farmer's own labour force and machines for the harvesting of timber crops, and diminish the importance of forestry to the farm unit.

The extension of forestry is handicapped by the main interest of farmers of these regions being generally concentrated on agriculture, with forestry taking a subordinate position. The income from stumps forms an economic reserve, principally applied in conjunction with mechanization, and other major agricultural investments. Furthermore, the ordinary reinvestment in forestry is often neglected, even though sufficient resources are available. Investments in agriculture tend to be given priority. The modernization of forestry is also hampered by the traditional norms and the rigorous social control typical of village communities.

The small size of compact arable areas is a characteristic of the regions of *scattered settlement*. The inferior conditions for field cultivation is usually compensated by intensive dairy and livestock production, and

forestry. The income from both stumps and labour is of importance to the forest-owner. A favourable location of the forest holding in a cohesive belt around the farm centre — typical of areas of scattered settlement — facilitates the use of the owner's labour and traction in forest work. Consequently, this ideal type is characterized by regular cuts with delivery contracts. In fact, the typical feature of Finnish family farms — the minimum use of both paid labour on the farm, and use of the farm's own labour force in external farm subsidiaries — is emphasized in these circumstances. Under the assumed conditions of favourably situated areas of scattered settlement good opportunities for particularly intensive tree growing are offered by the labour available, an adequate farm size, the concentrated location of the forest holding around the farm, and the tradition of family farms, extending over generations.

334. Regions with Expansive and Spread Effects

The regions with expansive and spread effects consist of the most extensive areas of the society with their neighbourhoods. In Finland, these represent only a small proportion of the total area of the country, and thus possess much less importance to farming than the types of environment mentioned above. The *keen competition between different forms of land utilization* and the *urbanizing environment* have effects on farming that are both favourable and unfavourable. The rising level of aspiration, and the weakening of the traditional social norms, facilitate the modernization of farming. However, the social environment accentuates urban occupations and methods, which are difficult to apply in farming. *The commercial farms* that fit this environment are above all highly specialized. Generally speaking, in the areas of spread effects, the favourable environmental factors for farming tend to predominate, while in expansion areas proper farming and particularly tree production is gradually compelled to withdraw to other occupations and forms of land use.

Forestry and its promotion encounter increasing difficulties in this urbanizing

environment. *The importance of forestry to the private economy of forest owners is decreasing.* Only few have an opportunity or interest, to participate, in highly-mechanized forestry work. The forest holdings remain for service only as an economic reserve, or as a source of recreation. An irregular and often declining supply of timber is a consequence. It remains to be seen whether forests are gradually replaced by savings, stocks or insurance also in the building of economic reserves and sources of economic security. In the expansion areas proper, where increasing amounts of woodland are cleared and occupied by settlement, industry, commerce and transport, the main attention is often paid to the rise in land values, and tree production is left to the background. In these circumstances

frequent speculation in land, and great interest in forest land ownership results in the fragmentation of woodlots proceeding even more rapidly.

Under such circumstances, *the investment opportunities external to farming represent the keenest competitors for forestry investments.* Consequently, marked attention is paid to the profitability of investments in forestry. The small size of forest units, and their fragmentation, handicap the use of effective machines, and technological development in general, and create serious economic problems in regard to forestry in these regions. Declining self-participation means that forest owners become increasingly dependent upon the official extension and the cooperative organizations for labour and services in management and marketing.

4. METHODOLOGICAL SETTING

41. The Scope and Outline of the Empirical Stage

The philosophical commitments — the equal status of mental and physical variables, and the endeavour to make holistic explanations — together with the method of analysis aimed at, and the theoretical framework of the study, define the outlines of the empirical analysis. These commitments and some discretionary methodological decisions are further specified below.

The objects of the empirical analysis taken are the rationale — grounds and criteria of choice — of decision-making by forest owners in relation to management, co-operation and the promotion of private forestry.

The conceptual schemes of OZBEKHAN (1969) and NICOSIA (1966), with the hierarchical structure of normative, strategic and operational decisions, and the parallel inner states with predispositions, attitudes and motivations, are used as the primary starting points. However, the attention in the empirical analysis is restricted to *the normative and strategic decisions*. Consequently, the analysis is not tied to single decisions or concrete decision-situations. Instead, an analysis is made of the more general rationale of *a large group of stipulated decisions, or type of decision*. It was supposed that this restricted scope of the empirical analysis would be more amenable to the cross-sectional study preferred here. Nevertheless, the longitudinal or panel studies of concrete decision-situations, with their normative, strategic and operational elements, would offer interesting perspectives for further studies.

The method applied, and the strategy of the explorative factor analysis, lend some features to the methodological setting of the study (cf. pp. 59–62). In regard to the empirical analysis, the factor analytical approach presupposes *a large number of variables*, which adequately cover the domain concerned (cf. THURSTONE 1961, pp. 55–56). Further, it allows of the inclusion of variables with different levels of measurement. This is of some importance, particularly when an

attempt is made simultaneously to handle both mental variables, and environmental variables that are easier to quantify (cf. HAHTOLA 1967 a, pp. 37–45; 1967 b, pp. 40–41; KALIMO 1969, pp. 172–179; ÜBERLA 1968, pp. 303–317). By reason of the ecological framework of this study and the assumed advantages offered by contextual strategy, use is made of variables of different aggregate levels; this additionally extends the scope of the empirical analysis (cf. HEISKANEN 1967, pp. 102–103, 116–118; VALKONEN 1969, pp. 64–68).

42. Analytic Approach

The theoretical framework presented above implies that the decision-making of forest owners is concerned with numerous decision variables: a complex set of internal variables — norms, goals and motivations — and a manifold of environmental conditions. However, this complex picture consists of simpler elements, hierarchically-ordered single decisions, which comprise only a small sub-set of the relevant decision variables. It is assumed that such simplification of the decision model is necessary for both theoretical reasons and the limited capacity of the human mind. Consequently, the method of empirical analysis should facilitate *a simplified description and explanation of decision-making and its rationale*.

The above research situation closely resembles *the explorative factor analytical approach*. According to THURSTONE (1961, p. 57):

»In factorial investigations of mentality we proceed on the assumption that mind is structured somehow, that mind is not a patternless mosaic of an infinite number of elements without functional groupings . . . In the interpretation of mind we assume that mental phenomena can be identified in terms of distinguishable functions, which do not all participate equally in everything that mind does. It is these functional unities that we are looking for with the aid of factorial methods.» (see also AHMAVAARA 1957, pp. 18–22).

Along with this strategy, the set of internal and external decision variables included in the empirical analysis is structured by factor

analysis. It may also be pointed out that the interpretation in the explorative factor analysis has holistic and hermeneutic features which resemble the philosophical commitments stated (p. 16; refer also to ESKOLA 1971, pp. 323–324). Interpretation of the structures revealed by factor analysis as, say, »types of decisions», »decision situations», »practical necessities of the situation», »types of environment» or »value orientations», is decided upon the basis of the factor descriptions available, and the theoretical framework of the study (cf. RILEY 1963, p. 441; SARIOLA 1961, p. 46). As the empirical analysis is concentrated upon the general rationale of normative and strategic decisions, and not upon the more concrete operational decisions linked to real situations, the primary search is for factor descriptions interpretable as *value orientations* or as *types of socio-economic environment*. An endeavour is then made to explain the decision-making — i.e. the behaviour — of forest owners upon the basis of these constructs.

In choice of the alternative factor descriptions, use is made of the formal criteria of *varimax* (cf. HARMAN 1960, pp. 301–308) and of *analytic cosine* (MARKKANEN 1963, pp. 1–3) solutions of rotation with the principal axis method of factoring.¹⁾ An attempt with theoretically-directed rotation, taking fixed variables as factor axes, led to a solution with axes that were too oblique. Moreover, it proved difficult to find single variables, which — used as factor axes — would have formed factors with the content desired.

The main idea of MARKKANEN's analytic cosine solution consists of revealing the corners of the vector description of original variables, and of setting the factor axes along the variables located near the corners. *The most orthogonal oblique solution, with factor axes along original variables, is thus sought.* The search procedure starts from every variable in turn, with the cosines of factor axes and the determinant of factor correlation matrix used as criteria of the orthogonality of the solutions (MARKKANEN 1963, pp. 1–3).

As concerns the alternative explanatory

schemes, the philosophical position adopted presupposes that the main emphasis is laid upon the theoretical constructs as a whole, and not upon the single variables. There is, accordingly, a priori no reason to divide the variables into causes and effects, or independent and dependent variables. Nor is it necessary to consider, say, that the mental and environmental variables represent »different causal levels», and as a consequence treat them separately. Instead, an attempt is made to include all the variables falling within the domain of the study *in the same factor analysis*, within the capacity of computers (cf. HAHTOLA 1971 c, pp. 257–258, 274–275; cf. JÄRVELÄINEN 1971 a, p. 38; 1971 b, pp. 287–290; THURSTONE 1961, pp. 55–60; cf. VALKONEN 1971, pp. 86–88). Notwithstanding the equal philosophical status of the variables in this study, and their inclusion in the same, combined factor analysis, the single variables and even *the relationships of mental and environmental variables* are then analysed on the basis of the factor-analytical constructs revealed (cf. HAHTOLA 1967 a, pp. 77–79; 1967 b, p. 31; JÄRVELÄINEN 1971 b, pp. 288–289; MARKKANEN 1964, pp. 4, 15; MÄKELÄ 1972, pp. 13, 44).

Different opinions are held about the suitability of factor analysis in this kind of investigation, where attention is paid to *the relationships of individual variables*, and where causal terminology is used in general (cf. HAHTOLA 1971 c; JÄRVELÄINEN 1971 b; REUNALA 1972, p. 30). According to an extreme view, factor analysis is quite inappropriate for the treatment of variables with different causal levels (cf. BLALOCK 1964, pp. 167–169, 183; COLEMAN 1964, pp. 20–21; JÄRVELÄINEN 1971 a, pp. 38; 1971 b, 287–290; VALKONEN 1971, pp. 86–88, 110–121), but some Finnish studies of the behaviour of forest owners seem to indicate that the area of useful application of factor analysis may not be so limited. In some explorative cases of causal analysis, the factor-analytical approach has proved to be even more suitable than the partial approach, for example by the application of regression analysis (cf. HAHTOLA 1971 c; cf. JÄRVELÄINEN 1971 b; MÄKELÄ 1972, pp. 44–46; PÄIVIÖ RIIHINEN 1971).

In general, the differing views on the suitability of some mathematical device, say factor analysis, in a given research situation, may be held as natural concomitants of *different research strategic preferences*, of which the existence apparently enhances

¹⁾ The computations were made in THE COMPUTING CENTRE OF THE UNIVERSITY OF HELSINKI, and in THE DEPARTMENT OF ELECTRONICS OF OY NOKIA AB.

the science. In some cases, however, the most restrictive and inflexible statements concerning the applicability of the factor-analytical approach in causal type analyses seem based upon the *ontological conception of causality* (cf. p. 60), which allows of only the use of special explanatory schemes and analytical devices, and thus excessively restricts the methodological alternatives (cf. BLALOCK 1964, pp. 9–11, 14–21, 27–30; HAHTOLA 1971 c, pp. 255–257, 274–275; JÄRVELÄINEN 1971 a, p. 38; VALKONEN 1971, pp. 81–82, 87–88). The estimation of fruitfulness of alternative approaches in a given research situation is then precluded by the firm position as concerns their possibility (cf. ALLARDT 1953, pp. 77–83; HEISKANEN 1967, pp. 9–13).

43. Empirical Material

The empirical material was compiled by means of postal inquiry comprising *two separate areas*, the forestry board districts of Pohjois-Karjala and Uusimaa-Häme (see app. 11, p. 112). The former is located in a depressed area of East Finland, the latter in a very expansive area of South Finland, in the neighbourhood of Helsinki. Within each of the 42 forest management associations of the area (each comprising 1–2 communes), the questionnaire was sent to 9–11 forest owners.

The forest owners who had most recently taken part in *forest management planning* were chosen for inclusion in the survey. It was supposed that these forest owners were the ones most aware of their forest management objectives, and consequently those most capable of answering questions con-

cerning the rationale of their decision-making in forestry matters. In view of the method of data collection, the farms established by the settlement laws are over-represented in the sample, since for a given period the plans of forest management are compulsory as far as they are concerned. However, the empirical material employed in this study was not designed to provide a statistical representation of a given population (cf. THURSTONE 1961, pp. 324–325, 470–472).

The proportion of the positive respondents who filled in and returned the questionnaire was as high as 82 per cent — thanks especially to the active support of the organizations of private forestry. The distribution of the final sample by forestry board districts, by size of forest holdings, and by restrictions on forest utilization (mainly settlement farms) is indicated in fig. 2.

The *study questionnaire* is reproduced in appendix 1 (pp. 77–93). Part A of this concerns details of the characteristics of the forest owner and his farm property, family conditions, labour resources, acreage and location of the farm, kind of tenure, and the prospects of its continuance.

The questions in part B relate to the opinions of forest owners about the ends and means of their forest management, of cooperation, and of the extension of private forestry.

Part C concerns the lines of production of the farm, along with some management

Fig. 2. Size and distribution of the sample (number of owners)

Kuvio 2. Näytetilojen lukumäärä ja jakautuma

	Woodland acreage class, ha				Total
	–39	40–59	60–99	100–	
Pohjois-Karjala					
forest utilization					
– free	8	15	21	22	66
– restricted	23	33	18	3	77
Uusimaa-Häme					
forest utilization					
– free	50	26	36	29	141
– restricted	50	4	—	—	54
TOTAL	131	78	75	54	338

expectations and trends. This part further includes questions in regard to forest owners' opinions of some actual forest-political issues.

The general value systems of the forest owners are explored in part D. Particular emphasis is laid upon the forest owners' orientations towards values related to farming, work, co-operation and social change.

Some of the questions included in the form originate from the works of JÄRVELÄINEN (1971 a, pp. 89–92) and LITTUNEN (1963). Otherwise, apart from the earlier works of the present writer (HAHTOLA 1967 a, 1967 b), the presentations of JOHNSEN (1968) and NICOSIA (1966), and articles appearing in «Goals and Values in Agricultural Policy» (Iowa State University Press, 1961) and «Our Changing Rural Society» (JAMES H. COPP (ed.), 1965, Ames) were particularly employed in the formulation of the questionnaire.

In addition to the data included in questionnaire, the empirical material comprised information on the characteristics of the wooded areas concerned, extracted from the *forest management plans*. A list of these variables is contained in appendix 2 (pp. 93–94). It includes the distribution of forest land by development classes, volume of stocking, annual increment, and the planned cuttings.

Finally, the empirical material contains *factor scores representing the social structure* of Finnish communes, as shown and interpreted by OLAVI RIIHINEN (1967 b, 1970)¹. The major items of the 5 factors used in this study — named «centrality», «regional development», «mobility», «expansiveness» and «agricultural modernity» — are to be found in appendix 3 (p. 94).

The accuracy of the measurements applied in construction of the variables used in the final analyses is rather low. The great majority of them, numbering 87 have been formed by *ordinal measurement*, including 5 dichotomies. Eight variables formed by ratio measurement, together with the 5 scored factors mentioned above, mainly based upon ratio measurement, represent the highest level of measurement. However, the most noteworthy feature of the empirical

material used in this study might be that the major proportion of the variables — viz. 59 — represent sets of fixed alternatives to questions, thus giving rise to *technical correlations* between variables (cf. p. 61).

The form of the questions concerned, and the scoring method applied, are indicated in appendix 1 (pp. 77–93). The distributions of the variables employed have not been normalized (cf. VALKONEN 1971, pp. 15–25).

The means and standard deviations of these variables are listed in appendix 4 (p. 95).

44. Factor-Analytic Descriptions

The methodological decisions connected with the choice of the factor descriptions used in the study were made with the following aims in mind: 1) *one overall factor analysis*, and 2) factor descriptions of the material, interpretable either as *value orientations* or as *types of socio-economic environment* defining the rationale of decision making.

The total number of variables involved in the questionnaires and the ecological factor scores exceeds 200. For practical reasons — and especially in view of the limited capacity of the computers — the number of variables to be included in the final factor analyses had to be restricted to about one half. *Restriction of the original variables* was preferred to the overall use of factor scores and second-stage factor analysis. It was assumed that the employment of original variables would lead to more firmly interpretable, and consequently more valid factors than the use of factor scores in second-stage analysis. Experience gained in the earlier factor-analytic studies made by the author (HAHTOLA 1967 a; 1967 b) suggested this course (cf. VALKONEN 1971, pp. 117–118).

The number of variables included in the final analyses was reduced to 100, upon the foundation of preliminary 12-dimensional factor solutions made separately for the external and internal decision variables. In particular, the number of external variables was diminished by the exclusion of complex

¹) The unpublished factor scores are used by kind permission of Professor OLAVI RIIHINEN (1970).

variables and variables with low communality.

The sum of eigen-values or *total communality* in the factor analysis with the final 100 variables represented 18 % of the total variance (number of variables) in the 6-dimensional and 31 % in the 15-dimensional solution employed. The proportion of common variance to the total, explained in this analysis, is thus relatively low in comparison with sociological and psychological factor-analytical studies in general (cf. MARKKANEN 1964, pp. 6–8).

Mention is due of some of the reasons that led to the low common variance. First of all, the questions might have been inconsistently understood, resulting in a *lowered validity* of the variables. The effect of the low validity, and other factors increasing the unsystematic individual variance of opinions was weighted in this analysis by the choice of *individual forest owners* as the main units of analysis, instead of some aggregates (LARSSON 1961, p. 145). If practicable, the aggregates of individual data were not used for fear of loss of relevant individual information. For the same reason, *no more variables with low correlations were excluded* from the analysis, although such a procedure would have increased the proportion of common variance (cf. HAHTOLA 1967 b, pp. 26–29; HORST 1965, pp. 551–552; MARKKANEN 1964, pp. 6–14; McNEMAR 1959, p. 187; VALKONEN 1971, pp. 51–52). It should also be remembered that — as the aim was the most general explanation of the research field — a *condensed factor description*, even with a low total communality, was preferred to more dimensional descriptions (HAHTOLA 1971 c, pp. 249–250; MARKKANEN 1964, pp. 5–6).

The high proportion of unexplained variance should always be regarded as harmful, and as a challenge to be met by future, more accurate studies. However, as far as the factor analysis is concerned, some grounds have been presented to justify even the use of descriptions which represent no more than a relatively small part of the total variance. Thus, according to the philosophy of factor analysis, this approach

applies only *the most systematic*, and consequently *the most reliable* part of the information involved in the empirical material. The low reliability of individual variables¹⁾ is further compensated by the simultaneous analysis of a large number of variables when conclusions are being drawn (cf. pp. 16, 24; HAHTOLA 1967 a, pp. 36–39, 139–140; 1971 c, pp. 268–271; HORST 1965, p. 95; THURSTONE 1961, pp. 336–338).

In fact, the factor-analytical descriptions of the domain of the study were first made separately for the two research areas. The factors derived were interpretable as different types of farms with different forest economic goals. Some structural differences between the research areas were also brought to light on comparison of the separate factor descriptions (HAHTOLA 1971 d). However, these regional descriptions seemed too minute for the purposes of this study. As a result, a more general description was sought, with *the whole material of the study* as a basis.

The final analyses, with the combined material and 100 variables, were then effected by means of successive varimax solutions with decreasing 15–6 dimensions. Descriptions, increasing in generality, interpretable on the foundation of the theoretical framework of the study, were aimed at (cf. HAHTOLA 1967 a, pp. 146–147). In the 15-dimensional solution (appendix 6, pp. 104–105), most of the variables representing general values and expectations were structured to form 3 factors. *The value orientations*, and the impact of normative decisions in the goal-setting of forest owners, are thus examined in chapter 5 primarily upon the basis of factors 2₁₅, 4₁₅ and 8₁₅, with factor 2₆ from the 6-dimensional varimax solution also being employed (appendix 7, pp. 106–107).

The ecological variance became dominant on diminution of the number of dimensions. The varimax solution with 6 dimensions evinced some resemblance with the types of socio-economic environment of farming presented in chapter 33. In particular, the first dimension, representing the differences between the two research areas, and the

¹⁾ In factor analysis, the communalities are generally used as estimates of the reliabilities (HARMAN 1960, p. 15; THURSTONE 1961, p. 85).

second factor, primarily depicting the value orientations of old forest owners (appendix 7, p. 106), did not seem to suit regional classification. Finally, the oblique rotation¹⁾ with 6 factors, and an analytic cosine solution (MARKKANEN 1963, p. 103), produced a satisfactory description, reasonably well interpretable on the basis of the ecological framework of the study. This is applied in chapter 6 in analysis of impact of the social and economic environment in decision-making by forest owners.

The way in which factor descriptions are employed in this study can be characterized as *halfway between formal and theoretically-directed rotation*. Notwithstanding the use of formal rotation methods alone, the choice

between orthogonal and oblique solutions, the number of dimensions, and the choice of factors used finally (cf. pp. 39–40) are determined by theoretical viewpoints. The use of only some of the factors in a factorial solution is a distinguishing procedure which may prove problematic under some conditions. As factor analysis is a very flexible method, other ways for its use would have been available in accordance with the objectives of the study, and the research strategy chosen (cf. MARKKANEN 1964, pp. 14–15, 55–65, 70–71). In this case the decisive factor was the assumption that the purposes of the study were also attainable with standard computer programmes (cf. pp. 59–62).

¹⁾ The types formulated by orthogonal varimax factors can be considered as resembling *empirical types*, whereas the oblique factors have more features of *ideal types* (cf. KOLI 1961, pp. 91, 107; ROGERS 1962, p. 60; SARIOLA 1961, p. 46; VALKONEN 1965, pp. 5–6).

5. PREDISPOSITIONS AND THEIR IMPACT IN DECISION-MAKING

51. The Preference for Subsistence Economy

In the interpretation of factor 2₁₅, the main attention is devoted to variable 262 (dependence on own resources), with its variance almost entirely concentrated on this dimension (fig. 3, p. 31). Together with the loadings of variables 270 and 273, expressing an emphasis upon landowning as a guarantee of prosperity, security and independence, these features indicate an endeavour to achieve economic independence. When attention is also given to the weighting of hard work (256), and to the farm backgrounds (discussed below) the factor concerned seems to represent *preference for subsistence economy* including strivings towards individual freedom and economic independence, characteristics of small-scale agriculture (cf. BISHOP and BACHMAN 1961, p. 250; BREWSTER 1961, pp. 117–125; BREIMYER 1965, pp. 60–74; HAHTOLA 1967 b, pp. 20–21; HEADY and BURCHINAL 1961, p. 17; LOOMIS and BEEGLE 1955, p. 267; LITTUNEN 1962, p. 165; SMELSER 1965, p. 104; TALBOT 1961, p. 216). With the features referred to above as a foundation, the factor 2₁₅ is also interpretable as depicting the emphasis upon individual freedom and effort as opposed to organization and cooperation (cf. FARQUHAR 1966, p. 178; OLAVI RIIHINEN 1965 a, p. 16).

The intolerance of differing principles, expressed by the loading of variable 254, points towards strong social control and a pressure towards conformity. According to LITTUNEN (1962, p. 137) a person with an insecure position strives towards conformity, whereas a secure person seeks freedom. Thus, in this case, the stressing of conformity of principles could be interpreted as a means to attain security by small-scale farmers. From the aspect of the known dichotomies, Gemeinschaft-Gesellschaft and mechanical – organic solidarity, the features of this factor, subsistence economy and pressure toward conformity, resemble Gemeinschaft-type organizations (cf. OLAVI RIIHINEN 1965 b, p.

9). It can be assumed, therefore, that the striving to achieve economic independence indicated by factor 2₁₅ may also imply resistance to organized cooperation of Gesellschaft-type, requiring contractual, organic solidarity (cf. HAHTOLA 1967 b, pp. 20–22; PÄIVIÖ RIIHINEN 1970, pp. 7–11). In the light of these viewpoints, the parallel emphasis laid upon both *economic independence* and *social dependence*, as expressed by factor 2₁₅ seems understandable.

From the farm backgrounds of factor 2₁₅ (fig. 3, p. 31), it is realizable that the preference for subsistence economy is accentuated in work-intensive, *small-scale farming* (201, 203, 241). This coincides with common conceptions on the influence of social factors in the immobility of small farmers. The free and independent character of agricultural work on a person's own farm may compensate for the economic handicaps (cf. BREWSTER 1961, p. 131; FARQUHAR 1966, p. 162; HAHTOLA 1967 b, p. 19; HEIKINHEIMO and RISTIMÄKI 1956, pp. 80–81). Besides that of small-scale farmers, the esteem of subsistence economy is accentuated among *old forest owners* (228). Consequently, the low proportion of delivery cuts (79) may result from old age and a decline in physical capacity to undertake heavy forest work (cf. HAHTOLA 1967 b, p. 38; MÄKELÄ 1972, p. 25). The optimistic expectations concerned with the profitability of forestry (101) associated with this factor are also understandable when consideration is given to the growing importance of forestry during recent decades, supposedly experienced by old forest owners (cf. HAHTOLA 1967 b, pp. 12–13).

Analysis of the factor loadings in part B of the questionnaire (fig. 3, pp. 31–33) discloses some rationale of management decisions associated with subsistence economy. In regard to the use of forest income (B 1), it can be realized that emphasis is laid upon the payment of taxes rather than productive improvements and investments (7, 10, 13). This is quite consistent

	Factor 2 ₁₅ »Preference for subsistence economy»	Factor 4 ₁₅ »Attachment to land»	Factor 8 ₁₅ »Resistance to change»	Factor 2 ₆ »Tradition- alism»
<i>Forest holding</i>				
205	A3. Size of the smallest plot			
206	A3. Distance of the farthest plot			
207	M7, M8. Proportion of seedling stands and openings (development classes 0-1)		-	
209	M10. Proportion of accretion stands (development class 3)		+	
211	M13. Proportion of underproductive stands (development class 6)			
212	M14. Mean volume		+	
213	M15. Increment percentage		(-)	
222	M25, M26. Restrictions of forest utilization		-	(+)
B. MANAGEMENT				
<i>B. 1 Use of forest income</i>				
6	for part payments and interest on debts		(-)	
7	for the payment of taxes	+	(+)	+
10	for building of dwelling or production houses	-		(-)
13	for draining, electrifying, or other basic improvements	-		
14	for educating the children			
<i>B.3 The ways forest enhances the value of the farm</i>				
19	it raises the comfort of the home and offers opportunities for reaction			(+)
20	it gives income from sales on the stump	(-)	(-)	-
23	the soil value raises continuously for instance as building site	(-)		
<i>B. 4 Objectives of silvicultural measures</i>				
24	to fulfil the provisions of law	+		+
25	to tend well and augment the property			
26	to secure regular, constant cutting possibilities	-		-
27	to secure cutting possibilities for rainy days		(+)	
28	to fulfil duty to the society			+
<i>B. 5 Things giving positive picture of a forest owner</i>				
29	fertilization of forests	(-)	(+)	(-)
30	vigorous young stands	(-)		(-)
31	cleaning of stands		(-)	
32	stands of large-sized trees	(+)	(-)	(+)
33	extensive areas sowed and planted	(+)		(+)
<i>B. 6 Importance of the percentage return on investment decisions</i>				
34	when buying a wooded area	(+)		
35	when starting artificial regeneration	+		+
<i>B. 7 Best ways of managing forests</i>				
36	selling when the price of timber is most favourable		(-)	
37	profitable buying and selling of wooded areas			(+)
38	arranging employment for own labour and machines		+	
40	producing as much timber as possible per hectare	-	(-)	-
<i>C. 11 Best ways of saving</i>				
86	to save in the bank	(+)		(+)
87	to save by shares in a housing association		(-)	(-)
88	to save by life insurances			(+)
89	to save by other bonds and securities	(-)		
90	to save by growing stock		(+)	

	Factor 2 ₁₅	Factor 4 ₁₅	Factor 8 ₁₅	Factor 2 ₆
	»Preference for subsistence economy»	»Attachment to land»	»Resistance to change»	»Tradition- alism»
<i>C. 12 Competitors to forest investments</i>				
91 agricultural investments	-	(+)		-
92 investments outside the farm				(+)
93 necessary expenses of the family	+	-		(+)
94 car, TV, travelling, and other such expenses				+
95 saving	(+)			+
C. COOPERATION AND PROMOTION OF PRIVATE FORESTRY				
<i>B. 8 Best ways of promoting small-scale forestry</i>				
41 to enlarge the farm size				(+)
42 to employ more contractors than before				(-)
43 to leave more tasks than before to be done at the expense of the State				(-)
44 to leave more tasks than before to be done at the expense of timber companies		(-)		(-)
45 to increase joint ownership			+	(-)
46 to increase mutual cooperation	(-)		+	(+)
47 to intensify training and educating				(+)
<i>B. 9 Obstacles of mutual cooperation</i>				
48 lack of qualified leaders	(+)	(-)		
49 economic problems	(+)		(-)	(+)
50 cooperation diminishes the working oppor- tunities of a single forest owner			(-)	
51 discord between forest owners	-			-
55 fear of losing the power of decision in favour of other interest groups			+	
<i>B. 10 Decisions most easily delegated</i>				
56 choice of treatment method of the forest		(-)		
57 choice of time for selling and cutting	(+)	+		(+)
58 choice of buyer				(-)
59 choice between sale on the stump, delivery sale or cash sale			(-)	(+)
60 choice of logging method		(-)		
61 making an agreement on prices		(+)		
<i>B. 11 Preferred fields of cooperation</i>				
62 raising stands	(+)			+
63 selling timber	(-)			-
64 logging	(+)			
65 draining and building of forest roads	(-)	(-)		
<i>B. 12 Objectives of cooperation</i>				
66 hiring of permanent labour	(+)		(+)	(+)
67 acquiring machines		(+)		(-)
68 engaging of forest experts	(-)			(-)
69 arranging of advance financing	(+)			(+)
<i>B. 13 Form of delegation</i>				
70 one man - one vote				
<i>B. 14 Centralization of cooperation</i>				
73 power of decision in a village organization ...				(-)
116. Accuracy in filling out questionnaire	-			-

SYMBOLS:

(+), (-) = loadings of magnitude .10-.19

+ , - = loadings of magnitude .20 and over

In forest management, the features of passive, subsistence economy also dominate (B 3, B 4, B 7). The silvicultural measures are not motivated by the increase in sustained cutting possibilities (26), but by the provisions of law (24). The forestry connected with this factor cannot be characterized as active timber production (20, 40, 95); rather, it takes on the appearance of mining or *sparing exploitation of natural resources*. These features coincide with the forest management goals in traditional regions, observed and reported by JÄRVELÄINEN (1968, pp. 88–89). Moreover, the prestige given to the owner of stands with large sized trees, and extensive sown and planted areas, may in this context have to be understood from the viewpoint of fulfilment of the provisions of law, and the sparing utilization of forest, rather than as a sign of intensive timber production (see HAHTOLA 1967 b, pp. 22–25).

In pursuance of the above line of interpretation, the relatively high weight put on the percentage return on investment in plans to buy a wooded area, or in the starting of artificial regeneration (B 6, 34, 35) may moreover not be a consequence of strictly economic thinking, but of general reluctance to make investments.

Part. C of fig. 3 (pp. 31–33) is concerned with the rationale of decisions in regard to cooperation and the promotion of private, small-scale forestry. In consistence with the interpretations given to this factor, the preference for subsistence economy seems to create a *negative attitude toward cooperation* (B 8, 46). However, a higher loading would have been expected. The negative loading of variable 51 (B 9) calls for even more consideration: although the forest owners concerned feel that the divergent principles are annoying, they do not regard discord between forest owners as a major obstacle to cooperation. The discrepancy in these responses may depend upon the forest owners having in mind only those forms of cooperation which do not too greatly restrict managerial discretion. It seems that in particular the cooperative undertakings that are economically of greatest advantage, and that need qualified leadership and strict organization, impose the most stringent requirements

upon the social relations of the participants (48, 49, 51).

On the foundation of questions B 11 and B 12, it is possible to examine how the preferences of forest owners in respect of the areas and forms of cooperation are affected by the predisposition to weight economic independence. Thus, the cooperation in selling timber (63), the draining and building of forest roads (65) and the engagement of forest experts (68), appear to be resisted by the forest owners concerned. It seems reasonable to hypothesize that just these forms of cooperation are conceived as being those that *most seriously restrict managerial independence*. On the other hand, these forest owners may be more willing to cooperate in raising stands (62), logging (64), the hiring of permanent labour (66) and the arrangement of advance financing (69) (cf. KÖPPÄ 1968, p. 9).

52. Attachment to Land

The second dimension of forest owners' predispositions indicated in fig. 3, factor 4₁₅, has many common features with the previous one, entitled the «preference for subsistence economy». In particular the esteem given to hard work (256), agriculture (270) and landowning (273) are features that belong to both of them. The variances of variables 265, 272 and 238, however, are clearly concentrated upon this dimension, and thus reveal the special characteristics of this factor. They indicate that it is primarily a matter of the preference for agrarian occupations, a belief in the continuation of the family ownership of the farm, and a moral obligation to utilize the whole productive capacity of land. Factor 4₁₅ is thus interpreted as «*attachment to land*» (cf. AALTONEN 1964, p. 153; BISHOP and BACHMAN 1961, p. 240; HAHTOLA 1967 b, pp. 18–19; LOOMIS and BEEGLE 1955, pp. 132, 315, 396; FUKUTAKE TADASHI 1964, pp. 286–289; WILKENING 1964, p. 8).

As security-orientation is generally ascribed to farmers (cf. BLANCKENBURG 1962, pp. 117–118; HAHTOLA 1967 b, pp. 15–16), the positive loading of variable 259, although a slight one — referring to readiness to risk-taking — seems a little surprising. The behaviour of this variable in the factor-

descriptions of the study, however, points to the possibility that risk-taking may have been understood in an exceptional way by the respondents. The variable 259 (readiness to take risks) seems primarily to measure the readiness to *risk monetary values* in order to *save some non-monetary agrarian values* (265, 273), rather than the readiness to engage in risk for economic profit (cf. pp. 42, 45).

Some small loadings on ecological variables, 278, 282 and 284, indicate that the attachment to land is slightly accentuated in the eastern research areas with low regional development and low expansiveness.

In regard to the principles of farm management associated with this factor, there is revealed a picture of *more active production* than in the previous case, and a *development towards cash economy*. Apart from emphasizing the efficient utilization of the growing capacity of land — as noted earlier — the endeavour to achieve intensive agricultural production is indicated by the way of argumentation concerning forest investments (C 12). The investments to forestry are considered as primarily being in competition with agricultural investments, and not with necessary living expenses as in the factor «preference for subsistence economy» (91, 93; cf. VIRTA 1970, pp. 5, 22).

Nevertheless, the features of active production are lacking in forest management connected with «attachment to land». *The primary concern is apparently in agricultural production* (cf. HAHTOLA 1971 a, pp. 113—116). Neither intensive timber production (40, 32) nor stumpage income is held to be important (B 3, 20). On the other hand, forestry seems to be a more integrated part of the farm totality than in the previous case. The employment offered by forest work is appreciated, so that delivery cuts dominate (79, 83, 38). The role of forestry as an economic reserve of the farm is also indicated (C 11, 90).

The factor «attachment to land» has only one noteworthy loading (44) indicating its impact upon the opinions of forest owners concerning the ways of promoting small-scale forestry (B 8). It implies a resistance to the growing influence of timber companies in private forestry. In

pursuance of the line of interpretation of this factor, the growing influence of timber companies may be regarded by the forest owners concerned as threatening the continuance of family ownership of farms (238), and the use of the farm's own labour and machines in forest work (79).

The factor pattern concerned also provides an impression of the attitudes towards cooperation that prevail in farms keenly attached to land. It seems that decisions connected with the employment of the farm's own labour force and transport capacity (59, 60), and also probably with utilization of the growing capacity of forest land (56), are for preference reserved for action by the owners themselves. However, marketing activities (57, 61) are more easily delegated to the cooperation agencies.

The interpretations based upon two single loadings, concerned with the preferred fields and objectives of cooperation (B 11, B 12) remain even more tentative than the previous ones. The preference for cooperation in the acquisition of machines (67) may be a concomitant of the traditional forms of agricultural cooperation, such as the former frequent use of common threshers. The minor importance attached to cooperation in drainage and the building of forest roads (65) may, in turn, depend upon the farms concerned probably being more frequent in the areas with good natural conditions for farming, and where these fields of cooperation are unnecessary, by reason of the small proportion of swamps and isolated forest plots.

53. Resistance to Change

The variables 259 (risk-taking), 271 (attitude towards social change) and 101 (belief that the profitability of silviculture will be worse in the future), structured to the third dimension in fig. 3 (factor 8₁₅, p. 31—33), are all related to the expectations of forest owners. If the signs of the loadings are also taken into consideration, this factor seems to indicate pessimistic expectations. It is expected that the profitability of silviculture will weaken in the future (101), risk-taking is not considered worthwhile (259), and the direction of social change is regarded as bad (271). A

striving for security and the avoidance of risk are some of the central characteristics generally ascribed to rural life. This factor seems particularly relevant to the risks involved in change. Risks of this kind are supposedly conceived in particular by those afraid of losing their position (cf. BREIMYER 1965, p. 29; HAHTOLA 1967 b, pp. 15–16; 1969 a, p. 269; LARSSON 1961, p. 148; LOOMIS and LOOMIS 1961, p. 426; SANDERS 1965, p. 311; SMELSER 1965, pp. 12–13; WILKENING 1964, pp. 2–3). If the main attention is paid to variable 271, which is loaded only in this dimension, the value-orientation in question is interpreted as *resistance to change*. It is worth emphasizing that in different conditions the nature of expectations and the reasons for resistance to change may vary.

Apart from the above reference to silvicultural expectations, the analysis of farm backgrounds, and the characteristics of the woodlot suggest that, in this case, the fear of forest owners that they will be worse off in the future may essentially depend upon forest-economic conditions. Apparently, forestry forms an important source in the whole prosperity of the farm (203, 83). The forest ownership comprises old, voluminous stands with low percentage increment (207, 209, 212, 213). Presumably, the property with its affluent forest resources has been inherited (222), and the owner is now well off (6). However, the possibilities of profitable timber-growing, and maintenance of the present high liquidity will not be equally favourable in the future, when the development class distribution of the wooded area is taken into consideration.

The security orientation of this type of forest owner also becomes apparent in the rationale of management. *The maintenance rather than the augmentation of the wealthy* seems to form the leading principle, both in the use of forest income (B 1), and in the motives of silvicultural measures (B 4) (6, 7, 27). Thus, the highest social prestige (B 5) is ascribed to silvicultural conditions and measures which secure high liquidity (32), or result in a quick return on the money invested (29). Measures which yield long-term profit only (31) are not given corresponding esteem.

It is interesting to perceive that the

strengthening of this factor, named *»resistance to change»*, seems to increase *willingness to cooperate* (46). In this context, the cooperation may be experienced as an *emergency measure* in a threatening situation (cf. BREIMYER 1965, p. 30). The main objective of the cooperation seems to be that of facilitating the use of wage-labour in private forestry (66); the participation of the farm's own labour and machinery does not play any major role (50, 59). Furthermore, it can be realized that an increase in the mutual cooperation of forest owners on these lines does not meet any serious economic obstacles (49), but maintenance of the power to decide in the hands of forest owners is conceived as a more difficult task (55). Apparently, the forest owners in question have the increasing influence of State and the timber companies in mind (HAHTOLA 1970 d, pp. 3–4; MÄKELÄ 1971, pp. 38, 44).

54. Traditionalism

All the names and interpretations, *»preference for subsistence economy»*, *»attachment to land»*, and *»resistance to change»*, given here for the different dimensions of forest owners' predispositions, refer to characteristics generally applied for the description of *traditional rural life* (cf. WILKENING 1964, pp. 8–13). These features are often combined and analysed unidimensionally, with continuums such as traditional-modern and rural-urban, or dichotomies such as *Gemeinschaft-Gesellschaft* (cf. LARSSON and ROGERS 1965, pp. 40–41; VALKONEN 1965, pp. 1–6). Since the second factor in the 6-dimensional varimax solution can be regarded as representing the traditional-modern continuum, it is also presented in fig. 3, and subjected to scrutiny here with a view to obtaining some additional insight into the predispositions of forest owners.

Fig. 3 (pp. 31–33) and appendix 7 (p. 106–107) illustrate that the general values and expectations connected with factor 2₆ resemble the previous factors *»preference for subsistence economy»* and *»attachment to land»*. Variables 256 (esteem of hard work) and 259 (independence of the aid of others) are the best indicators of this factor

although variables 254, 270, 272 and 273, representing known agrarian values — unanimity and social control, esteem of agriculture, land, land utilization and conservation — obtain also relatively high loadings in this dimension. When it is further considered that the variance of variable 228 — *age of the forest owner* — is almost entirely concentrated in this dimension, the factor concerned apparently represents the value orientation of the old generation of forest owners, and can be named «*traditionalism*». If this dimension is analysed it may thus be possible to acquire an idea of the impacts of on-going social change in decision-making by forest owners.

The fact that the factors «*traditionalism*» and «*resistance to change*» do not possess common features in fig. 3 does not preclude the conceptual or theoretical connections of traditionalism and resistance to change (cf. LOOMIS and LOOMIS 1961, pp. 426, 433—453). It means only that the special aspect or form of resistance to change indicated by factor 8₁₅ seems quite independent of the traditional value-orientations of the old forest owners. This question will be further clarified in analysis of the impact of the social and economic environment in the rationale of decision-making by forest owners (cf. pp. 43—44).

In regard to farm backgrounds, the loadings of factor 2₆ also refer to small, *work-intensive farming* (201, 241), although to a less extent than the factor «*preference for subsistence economy*». In this case, the low proportion of delivery cuts (79) to total sellings may even be understood as a concomitant of the old age and limited physical capacity of the farmer (cf. MÄKELÄ 1972, p. 25). Similarly, the optimistic expectations relating to the profitability of forestry in the coming years may have been inferred from the increasing importance of forestry in the farm economy experienced by the old forest owners during preceding decades (cf. HAHTOLA 1967 b, pp. 12—13).

In correspondence with «*preference for subsistence economy*», the value orientation entitled «*traditionalism*» seems connected with a *passive, subsistence economy* (B 1, 7, 10; C 11, 86, 87, 88; C 12, 91, 93, 95) in which active timber production does not

play any role (B 3, 19, 20; B 5, 29, 30; B 7, 40; see also JÄRVELÄINEN 1968, p. 90). Among the objectives of forestry *public or collective interests* appear even more preponderant in this factor than in subsistence orientation. Silvicultural measures that primarily benefit future generations may be regarded as a matter of responsibility rather than an issue of private business (B 4, 24, 26, 28). Probably, the former lengthy periods of collective ownership and use of forests have given rise to orientation of this type (HAHTOLA 1967 b, pp. 22—24; 1970 b, p. 4; 1971 b, pp. 8—11). The collectivistic features of private forestry found in the traditional predispositions of forest owners — despite the parallel independence-orientation — may, in turn, be comprehensible in the light of the different traditions of forestry and agriculture in regard to land use and tenure.

The discrepancy in the responses to questions B 4 and B 6, emphasizing on the one hand the social responsibility for silvicultural measures, and on the other the decisive importance of the percentage return on investment in the planning of artificial regeneration (35), is as evident in this case as in the factor «*preference for subsistence economy*» (p. 34). Only the same, extremely tentative interpretation can be repeated here: the emphasis on the percentage return of a silvicultural investment in this context may indicate rather the general reluctance to invest in timber production than strict economic calculation. Correspondingly, the positive image given to a forest owner with extensively sown and planted areas (B 5, 33) may be a credit from the fulfilment of his social duty.

In regard to the opinions of traditional, old forest owners about the different ways of promoting private, noncorporate forestry (B 8), it appears that they prefer those approaches that do not restrict their managerial power of decision. They approve of measures to enlarge the farm size (41), and to intensify the training and educating of forest owners (47), but are not willing to delegate their management decisions to cooperation agencies (46, 45), or to contractors (42). This factor description seems to provide justification for the assumption that *the attitudes of forest owners are becoming*

more positively directed towards cooperation along with the generation shift. This is in agreement with the observations made by PÄIVIÖ RIIHINEN (1970, pp. 26) in respect of the attitudes of forest owners towards forest management associations.

In more detailed analysis of the attitudes adopted towards different areas of cooperation (B 11), it is recognizable that the cooperation in growing timber (62) is the most easily accepted field, and that cooperation in selling (63) is, in turn, most strongly resisted by the traditionally-orientating, old forest owners (cf. HAHTOLA 1970 d, p. 4). In view of the previous discussion, it can be assumed that timber-growing is conceived as a matter of collective action and responsibility, and is consequently regarded as the most feasible field of cooperation. Moreover, the Finnish forestry extension organizations have traditionally concentrated their activities principally on the offering of professional assistance in marketing and other silvicultural measures. In the 1960's, their activities have been ap-

preciably extended also to the promotion of forest owners' cooperation in the selling of timber (MATILAINEN 1971, pp. 201–204). In the light of this investigation, it can thus be expected that young forest owners may be more willing than the old to cooperate in marketing (63, 58). Cooperation in marketing apparently offers more financial gains (B 9, 49) than the traditional forms of cooperation, but may also impose greater social requirements upon the participants (51). In this respect, the increasing tolerance toward differing principles (254), and the increasing capability of reaching agreements and compromises that characterize the modernizing society are apparently improving these preconditions (HAHTOLA 1967 b, pp. 17, 20–22; 1969 a, pp. 261, 270; OLAVI RIIHINEN 1965 a, pp. 16, 54–70). Mention is due that the discord between forest owners were regarded by the respondents as the most important obstacle to cooperation (HAHTOLA 1970 d, p. 3; cf. also MÄKELÄ 1971, pp. 38, 44).

6. TYPES OF FARMING IN DIFFERENT SOCIO-ECONOMIC ENVIRONMENTS

61. Factor Descriptions Representing Ecological Types of Farming

The three most orthogonal 6-dimensional solutions, according to the standard computer programme for analytic cosine rotation (MARKKANEN 1963, p. 103), were in strict congruence with each other. They had the same variables as basic vectors in four dimensions, and even the remaining two dimensions, using different basic vectors,

had very similar interpretative contents in each solution. The mutual correspondence of the solutions may be considered to indicate a relatively clearcut, simple structure in the variable configuration.

The basic vectors of the three most orthogonal oblique solutions, according to determinants, were as follows; the corresponding factors are grouped one below the other (see p. 25):

I	II	III
det. 0,557	det. 0,490	det. 0,476
62 (cooperation in growing timber)	62 (cooperation in growing timber)	270 (esteem of agriculture)
68 (cooperation in engaging experts)	68 (cooperation in engaging experts)	68 (cooperation in engaging experts)
79 (proportion of delivery cuts)	79 (proportion of delivery cuts)	79 (proportion of delivery cuts)
93 (necessary expenses in competition with forestry investments)	93 (necessary expenses in competition with forestry investments)	93 (necessary expenses in competition with forestry investments)
209 (proportion of accretion stands)	209 (proportion of accretion stands)	209 (proportion of accretion stands)
282 (expansiveness)	284 (research area, PK-UH)	252 (distance from town)

In the search for similarities of these oblique factors with the ecological framework (fig. 1, p. 20) presented above in section 337, the first group of factors given above, with variables 62 (cooperation in growing timber) and 270 (esteem of agriculture) as basic vectors, did not suit the ecological scheme. It is observable from the loadings in appendices 8 and 9 (pp. 108–111) that this represents *the value orientation of old forest owners*, which seems quite independent of ecological factors, and thus corresponds with the varimax factor 2_a analysed in the previous chapter.

However, the appearance of variables 93 (necessary expenses in competition with forestry investments), 79 (proportion of delivery cuts) and 282 (expansiveness) among the basic vectors pointed to an interesting consistency of the corresponding factors and the typology of social and economic environment applied (fig. 1, pp.

20–23). A correspondence is apparent between the factors concerned and *the regions of agricultural problem areas, areas of intensive forestry in the optimum farming regions, and areas of expansion.*

Basic vector 209 (proportion of accretion stands) also has some connection with the regional typology used, although it is more remote. It has been demonstrated that in Finland the present regional distribution of different forms of settlement, village and scattered settlement, displays the former regional extension of shifting cultivation (HAHTOLA 1967 b, 25–26, 36–37; OLAVI RIIHINEN 1965 a, pp. 158–171). In central and east Finland in particular, shifting cultivation continued until the first decades of this century. Consequently, grounds exist for the assumption that the forests are younger, and forest land more easily regenerated in scattered settlement regions than in the regions of village settlement.

Indeed, it appeared that the three corresponding factors, with the proportion of accretion stands (relatively old) as basic vectors, also have some other features characteristic of the conditions of *village settlement areas*, one of the regional types described in the framework of the study (pp. 20–23).

The only noteworthy difference in the corresponding factors of solutions I, II and III related to the factors with the variable 68 (cooperation in engaging experts) as the common basic vector. Solutions I and III in particular displayed differences from each other. Although both of them referred to conditions with *absentee ownership and the abandonment of intensive farming*, they appeared to represent different types of socio-economic environment. The corresponding factor of solution I became more marked towards the southern research area, and was apparently connected with some spread effects, whereas the corresponding factor of solution III related to the eastern research areas and depressed regions.

The five factors from the 6-dimensional oblique solution I mentioned above, along with one factor from solution III, were thus taken to represent the six ecological types of farming (fig. 4, pp. 41–42). These factors are given more detailed interpretation in the following pages, with the principal attention being paid to their ecological features, value orientations and farm backgrounds. The rationale of decision-making by forest owners in different social and economic environments are then examined in chapter 7 with these factors as foundation. The decisions dealt with concern management, cooperation and the promotion of private forestry.

62. Depressed Regions

The factors chosen to represent the six ecological types of farming have been grouped in accordance with the ecological framework of the study, and presented in pattern form in fig. 4 (pp. 41–42; cf. appendices 8–9, pp. 108–111). The socio-economic features and farm backgrounds of these factors are given more detailed examination here with a view to their interpretation, and for

demonstration of the degree of their congruity with the theoretical framework. The two factors assumed to represent types of farming of the depressed regions are dealt with first.

On examination of the ecological loadings of these factors, it is observable that most of the features — long distance to bus (250), prevalence of the eastern research area (284), old-fashioned small-scale farming (283), depression (282) and immobility or emigration (280) are in close conformity with the picture of a *depressed region*. However, the positive loading of centrality (277) needs some clarification. The main items of this combined variable, used by OLAVI RIIHINEN (1970), comprise the size of the main centre, the diversity of administrative, commercial, cultural, medicinal and some other services available within the commune, and the proportion of labour force engaged by industries classified as cumulative (appendix 3, p. 94). In connection with high regional development (cf. OLAVI RIIHINEN 1967 b, pp. 6–9) this variable apparently expresses the concentration of cumulative industrial and commercial activities, whereas when connected with low regional development it may measure only the size of administrative centres, which are in turn proportional to the size of the corresponding communes (cf. OLAVI RIIHINEN 1965 b, p. 15; 1967 a, pp. 24–28). In the case of factor 1_{III}, the latter interpretation proved to be the most likely, as it was realized that some thinly-populated communes, particularly in the eastern research area, had the highest values in this variable (277; see appendix 11, p. 112).

When a closer examination is made of factor 4_I, the picture of *problem farming*, formed upon the basis of the basic vector (93, competition of necessary expenses) acquires supplementary confirmation from the farm backgrounds associated with the factor. They comprise small field area (201) high proportion of forest area (203), affluent labour force and labour-intensive line of production (241, 224), subsidiary earnings from outside farm (83), low level of housing (246) and some indication of advanced age (228). Moreover, the opportunities made available by the forest holding seem scanty,

Fig. 4. The ecological types of farming defined on the basis of factor patterns of variables measuring socio-economic environment and farm background of forest owners (oblique solutions I and III, app. 8-9, pp. 108-111)

Kuvio 4. Taloudellis-sosiaalisen ympäristön ja tilan taustatietojen perusteella määritellyt maatalouden ekologiset tyytit (vinot ratkaisut I ja III, liitteet 8-9, s. 108-111)

	Depressed regions		Optimum regions for farming		Expansive regions	
	Factor 4 _I Problem farming	Factor 1 _{III} Extensive part-time farming	Factor 5 _I Prosperous field farming	Factor 3 _I Labour- intensive family farming	Factor 2 _I Part-time farming	Factor 6 _I Commercial farming
<i>Ecological features</i>						
277 Centrality (OLAVI RIIHINEN1970)	(-)	+	(-)	(-)	+	-
278 Regional development »			(+)		+	+
280 Mobility »		-				+
282 Expansiveness »		-				++
283 Agricultural modernity »	(-)				+	+
284 Research area (PK=O, UH=I)	(-)	-	(+)		+	+
250 A19. Distance from the nearest bus stop	(+)			(+)	(-)	
252 A19. Distance from the nearest town				(+)	-	-
<i>General values and expectations</i>						
254 D2 »It is annoying if the prin- ciples of a friend differ from one's own principles»	(+)	(-)	(+)	(-)	-	
256 D4 »Money has value only when it is acquired by hard work»			+		-	
259 D7 »Many a time in this life, it is worth taking risks»	-	(+)				(-)
262 D10 »It is a shame if you are not able to depend on your own resources»			+	-	-	(+)
265 D13 »People who choose their profession thinking only of money do not act wisely»	(-)	+	+	(+)		-
270 D18 »Agriculture is an industry upon which the whole prosperity of the nation rests»			+		-	
271 D19 »It is good that our society changes because the changes are usually in a good direction»		+	(-)		(+)	
272 D20 »It is a shame if the land is left in unproductive condition»		(+)	(+)	(+)	-	(-)
273 D21 »Landowning is the safest quarantee of security and in- dependence»	(-)	(+)	+		-	-
238 All »Do you think that your heirs will continue to keep farm?»	-	(+)	+	(+)		(-)
96 C13 »Do you think that the forest area in your possession will diminish?»	(+)	(-)			(-)	(+)
101 C15 »Do you think that the profit- ableness of silviculture will be worse in the future?»		(-)	(+)	(-)		(+)
<i>Farm background</i>						
201 A1 Field area	-	(-)	+	(-)	(+)	+
203 A1 Ratio forest area to field ...	+	+	(+)	(-)		-
223 M1. M2 Absenteeism	(+)	+	(-)	-	+	
224 C1 Raising crops as a source of income	-	-	+	(-)		+
79 C4 Proportion of delivery cuts ..				++		
83 C8 Proportion of outside work .	+	+	-	(-)	+	(-)

	Depressed regions		Optimum regions for farming		Expansive regions	
	Factor 4 _I Problem farming	Factor 1 _{III} Extensive part-time farming	Factor 5 _I Prosperous field farming	Factor 3 _I Labour- intensive family farming	Factor 2 _I Part-time farming	Factor 6 _I Commercial farming
241 A13. A1 Number of men per hectare	+			+	-	-
246 A17 Level of housing	-		+	-	+	+
228 A4 Age of the owner	(+)		(+)		-	
<i>Forest holding</i>						
205 A3 Size of the smallest plot		(+)	(+)	(-)		(-)
206 A3 Distance of the farthest plot .		+		-	+	-
207 M7. M8 Proportion of seedling stands and openings (develop- ment classes 0-1)	(+)		-	(-)		-
209 M10 Proportion of accretion stands (development class 3)			++			
211 M13 Proportion of underproduc- tive stands (development class 6)		(+)				(-)
212 M14 Mean volume	(-)		+		(+)	+
213 M15 Increment percentage	(-)		(-)			+
222 M25. M26 Restrictions of forest utilization	+	(-)	-	+	-	(-)
116 <i>Accuracy in filling out the questionnaire</i>	(-)	+	-	(+)	+	(-)

SYMBOLS:

(+) , (-) = loadings of magnitude .10-.19
 + , - = loadings of magnitude .20 and over
 ++ = basic vector in oblique rotation

both with respect to stocking (207, 212) and increment (213). It is also recognizable that in this type of farming the proportion of farm units established by the settlement laws (222) is above average.

Nevertheless, the signs of traditional norms hypothesized by the theoretical framework (cf. p. 21) are almost entirely lacking in this factor, notwithstanding a slight indication of intolerance towards differing principles (254). Instead, it is held that risk-taking is not worth while (259), and that money should be decisive in the choice of a profession (265). These features, together with the low estimate of landowning (273), point to a *weakening of attachment to land* (cf. p. 30). This impression is further reinforced by the heirs not being expected to continue to keep the farm (238), and the expectation that the forest area possessed will diminish in the future (96). Thus, the readiness to emigrate, and abandon small farming seems to be increasing.

In turn, factor 1_{III} apparently represents circumstances in which the abandonment of farming has already partially occurred.

Absentee ownership (223) has increased. Whether this change is primarily of recent or of older origin is not definitely determinable on the basis of this factor of cross-sectional study. The labour input in farming (241) has declined with the proportion of work done outside the farm (83) remaining at a high level. The nature of work done outside the farm may have changed, however, from forest work to industrial and commercial activities; this consequently also leads to a change of living site to a more urban environment (cf. HAHTOLA 1962 b, pp. 9-10; 1971 d, p. 4). In view of subsidiary earnings and absentee ownership, together with the socio-economic environment of depressed areas presupposing a kind of extensive feature of economic life and land use, this factor is interpreted as *extensive part-time farming*. By the adoption of this the author has striven to distinguish this factor from factor 2_I, which also represents part-time farming, but in an environment different in kind (cf. pp. 44-45).

In regard to value orientations, this factor expresses an optimistic accepting

attitude towards social change (271). As the means of livelihood is no longer tied primarily to small-scale farming, a *moderate attachment to land* and a willingness to maintain the tenure of the farm is again recognizable (265, 272, 273). This factor is further connected with the optimistic perspectives in regard to the continuance of farm ownership in the hands of heirs (238), increase in the forest area (96), and the profitability of silviculture in the future (101). In the case of part-time farmers, in particular, *the selection made by the method of data collection* must be taken into consideration. Since the forest owners included in the study had taken part in forest management-planning, it can be assumed that they were also interested in the continuance of the farm ownership. Typical speculators may consequently have been omitted from the study.

The small positive loading of variables 211 (proportion of underproductive stands) may be regarded as indicating either an extensive level of timber production by absentee owners and part-time farmers, or the poor silvicultural condition of the wooded areas on transfer from small-scale farmers to this new category of ownership. The findings reported by REUNALA and TIKKANEN (1972, pp. 4–5) on the high silvicultural activity of non-farm private owners suggest that the latter interpretation is correct (cf. HAHTOLA 1967 a, pp. 88–89, 130, 165; JÄRVELÄINEN 1971, pp. 51, 69).

63. Optimum Farming Regions

On the basis of the basic vectors, and the ecological frame of reference of this study, factors 5_1 and 3_1 were considered to represent *the conditions of farming in optimum farming regions*. Here, an optimum region implies an *intermediate zone*, in which farming is not subjected to the effects of either backwash or marked spread. The fact that only a few ecological variables are loaded — with relatively small loadings — by these factors, is in conformity with this picture (fig. 4, p. 41). Factor 5_1 seems to become slightly stronger towards the southern research area (284), and along with the increasing material wellbeing measured by variable 278. In turn, factor 3_1 is associated with

some features of remoteness (250, 252). The moderate level of services available within the commune concerned, although below the average, is common to both (277).

It may deserve emphasis here that another line of argumentation is also quite possible. These factors which reveal low or absent ecological loadings can, with equivalent empirical evidence, be interpreted both as intermediate ecological conditions, and as factors that are *independent of the ecological environment*, for example, the properties of individual owners or farms. For pragmatic reasons, as on this occasion it has been decided to attempt the materialistic, ecological approach, the ecological interpretation is preferred.

If factor 5_1 is subjected to more detailed analysis, it is observable that the general values and expectations associated with it are congruent with the social features generally assigned to *village settlement*. These comprise pressure toward conformity and striving to attain managerial independence (254, 256, 262). Further, they display a strong attachment to land (265, 270, 272) and the continuance of farm ownership (238). Moreover, the resistance to change — indicated by the loading of variable 271 — is a characteristic generally associated with traditional *Gemeinschaft*-type rural villages (cf. p. 37).

The farm backgrounds and characteristics of the forest holding connected with factor 5_1 do not, however, fit as well as its social features with the supposed conditions of village settlement regions. In particular, the abundant forest resources (203, 209, 212) and the lacking of signs of fragmentation of forest plots (205) do not point to a subordinate position of forestry in the farm economy or to difficulties affected by fragmentation, as has been supposed in my previous works (cf. HAHTOLA 1967 b, pp. 58, 65). A probable reason for this is that typical regions of village settlement may be lacking in the present research areas (cf. OLAVI RIIHINEN 1965 a, pp. 158–171).

However, there is discernible the assumed preponderance of field crops in production (224) (cf. p. 22). Moreover, it can be remarked that apart from the abundant forest resources, other kinds of wealth also seem

to be associated with this factor, as is indicated by variables 201 (field area) and 246 (level of housing). Some indication of old age (228) also belongs to the features of this factor. If more attention is paid to the preponderance of field crops, and to agrarian prosperity, than to the form of settlement, factor 5_I is interpretable as »prosperous field farming». Thus it somewhat resembles the factor of advanced, effective and prosperous agriculture found by PÄIVIÖ RIIHINEN (1963, pp. 63–64) in his investigation covering the whole of the country.

In comparison of the interpretative content of factor 3_I with the previous one, the first point apparent is that this also provides an impression of attachment to land (265, 272, 238), although in a more moderate degree than the previous factor, 5_I. Instead, the weaker pressure towards conformity (254, intolerance of differing principles), and the less marked emphasis upon economic independence (262, reliance on own resources) are some of the distinguishing features. This conforms rather well with the characteristics of *scattered settlement* established in the previous studies (cf. HAHTOLA 1967 b, pp. 35–37, 64–65; OLAVI RIIHINEN 1965 a, pp. 158–171; 1965 b, pp. 9–12).

The position of forestry in farm economy as shown by factor 3_I, is not so conspicuous as had been expected (cf. p. 22), although important. However, the low proportion of forest area to field (203) is partly compensated by the predominance of delivery cuts (79). A small indication of an advantageous location of forest plots (205, 206) is also discernible. In comparison with the previous factor of prosperous field farming, the conditions of forestry associated with factor 3_I are also favoured by the more optimistic expectations in regard to the profitability of silviculture in the future (101).

The dependence upon *the achievement opportunities offered by the occupier's own farm* is a feature common to both these factors that represent optimum farming regions, although in prosperous field farming a greater emphasis may be laid upon agriculture than forestry (cf. 34–35). Concentration on the production opportunities of the occupier's own farm is evident, for

example, by the low proportion of absentee ownership (223), and outside farm work (83). These features are in general assigned to typical family farming (cf. pp. 34–35). Nevertheless factor 3_I differs from factor 5_I by its more labour-intensive line of production (241, 224, 79), and a closer combination of agriculture and forestry. »Labour-intensive family farming» is thus considered a proper characterization for factor 3_I (cf. HAHTOLA 1967 b, pp. 35, 64).

64. Expansive Regions

The ecological loadings of factors 2_I and 6_I (fig. 4, pp. 41–42), classified as representing the conditions of farming in *expansive regions*, seem quite consistent, and appear to be in relatively close agreement with the ecological framework presented in section 334 (pp. 22–23). The factors express high regional development (278) and high or average mobility (280) and expansiveness (282); the last-mentioned variable is the basic vector of factor 6_I. Furthermore, they become more marked towards the southern research area (284), and are associated with a modern type of agriculture (283), and short distances between farms and towns (252).

The most conspicuous difference in the ecological features of these factors is concerned with variable 277 (centrality). Factor 2_I is associated with a high, and factor 6_I with a low centrality. The characteristics of factor 6_I — high expansiveness (282) but low centrality — indicate communes lying in the neighbourhood of expansive population centres. Apparently, these communes have not any dominating centre of their own, but by reason of the strong spread effects of the neighbouring area of industrial and commercial agglomeration, they have manifold economic activities, and a high level of regional development.

In the case of factor 2_I, however, the regional centres seem to be located within the boundaries of the communes (277). It is also likely that in nature these centres differ from the previous ones. According to OLAVI RIIHINEN (1967 b, pp. 1–5), trade and manufacture are different as concerns their cumulative and spread effects. He

maintains that the cumulation of economic life is primarily connected with the cumulation of commercial and other services, whereas many branches of manufacture are sporadic in nature, generating no more than weak spread effects to the surrounding countryside. In the light of these viewpoints, the content of factor 2_1 indicates communes with noteworthy administrative centres along with developed, but one-sided industry with spread effects that are only moderate or weak. Notwithstanding the high regional development of the area, consequently, the pull-effects of the centres seem more conspicuous than their spread effects, with the resultant transfer of surplus agricultural population to industrial occupations. In turn, the conditions represented by factor 6_1 , can be characterized as areas with ample immigration and emigration where the attraction is overshadowed by the spread effects of the neighbouring centres (cf. OLAVI RIIHINEN 1965 b, p. 13).

If the preponderance of *economic pull-effects* is adopted as a starting point for the interpretation of factor 2_1 , the characteristics of farming associated with it seem quite understandable. The increase in work outside the farm (83) is a natural initial stage in gradual development towards the abandonment of agriculture, the transfer to new occupations, and migration to towns (cf. HAHTOLA 1967 a, p. 136; JÄRVELÄINEN 1971 a, p. 51). Against this, the weak spread effects, with corresponding weak competition in land use, offer opportunities for absentee ownership (223) with a labour-extensive line of production, such as forestry (96). With reference to both work outside the farm, and to absentee ownership, this factor is interpreted as *part-time farming* (cf. the factor *extensive part-time farming*, p. 42).

The other background features of farming associated with factor 2_1 , a moderate size of field area (201), noteworthy forest resources (212), and a high level of housing (246), support the conception that in this case the attraction of towns and urban occupations rather than the poor conditions of agriculture represents the most impelling factor for the transfer to absentee ownership. The negative loading of variable 228 (age of the

owner) coincides with the transfer being in general accentuated by the generation shift (cf. REUNALA 1972, p. 8). It also indicates that part-time farmers, including absentee owners, tend to be younger in expansive than is the case in depressed regions.

In regard to the general values and expectations of part-time farmers and absentee owners, the loadings of factor 2_1 express a *modern, urbanized value orientation*. The weakening of pressure toward conformity (254, 256), and of the striving for managerial independence (262), facilitates migration and adjustment to Gesellschaft-type organizations. The values attached to land (270, 272, 273) have also lost their urgency, and the on-going social change is experienced as an acceptable, positive phenomenon (271).

In regard to the value orientation associated with factor 6_1 , a weakening of the attachment to land is also apparent (272, 273, 238). Provided that the interpretation given to the content of variable 259 (risk taking) holds (cf. pp. 34–35), the negative loadings of variables 259 and 265 (money is not decisive in the choice of an occupation) suggest that in this context farming is no longer characterized as a traditional *way of life*, but is conceived as an *economic enterprise*. A slight indication of resistance of organizations may still be discernible (162). The prospects of forestry are experienced as quite disadvantageous (96, 101), despite the good silvicultural state (211), and high volume and increment of the wooded area (212, 213).

The farm background features of factor 6_1 resemble those of factor 5_1 (prosperous field farming), and also point to prosperous farming with a large field area (201), high level of housing (246) and a line of production with field crops predominating (224). Forestry has a more subordinate position (203) than is the case with factor 5_1 . However, the supposed extreme fragmentation of forest plots is not recognizable (cf. pp. 22–23; HAHTOLA 1967 b, p. 64). The smaller labour input per hectare (241) is also a distinguishing feature of factor 6_1 , as compared with factor 5_1 , and it seems that the farming associated with the former is even more highly mechanized (283). In view of both the socio-economic environment, and the farm backgrounds, the type

of farming represented by factor 6₁ is interpreted as «commercial farming».

The factor descriptions of the present empirical material apparently give rise to some modification of the picture of farming in different socio-economic environments, as indicated by the ecological framework of the study (cf. ch. 33, pp. 20—23). This particularly concerns the expansive regions. Application of the new set of ecological variables established by OLAVI RIIHINEN (1970), differentiating between the cumulative and sporadic industries, and between the instrumental and intrinsic aspects of the level of regional development, provides a more exact and detailed presentation of the conditions of farming under

different effects of expansive and attractive spread (cf. OLAVI RIIHINEN 1967 a, pp. 6—20; 1967 b, pp. 1—9). Modern, commercial farming seems to be found in the expansive regions with high regional development surrounding the industrial and trade centres, rather than within the boundaries of the centres themselves. The development of agriculture appears to be particularly favoured by the expansive spread effects of trade and some branches of manufacture, but not by industrialization generally. For example, centres with one-sided manufacture may instead have negative, extensifying influences in the surrounding farming regions.

7. THE STRATEGIC DECISION-MAKING OF FOREST OWNERS IN DIFFERENT ENVIRONMENTS

The six ecological types of farming — «problem farming», «extensive part-time farming», «prosperous field farming», «labour-intensive family farming», «part-time farming» and «commercial farming» — have been formed on the basis of their ecological, social and farm background features. Simultaneously, the general value orientations — predispositions — of the farm owners concerned have been delineated. Each type can thus be considered as representing a special set of *normative decisions*, which in turn forms the basis for the strategic and operational decisions. We now proceed with analysis of *the strategic decision-making* of forest owners in different environments specified by these types (cf. pp. 20–21, 24, 27; HAHTOLA 1971 b, p. 15).

71. The Rationale of Farm Management

Throughout this study, the position has been taken that forestry is not an independent undertaking, but an integrated part of farming and the total economy of forest owners (cf. HAHTOLA 1967 a, pp. 7–8; 1971 b, pp. 7, 11–12). The decisions relating to the entire business economy of the owner and forest management are accordingly regarded as interwoven, and not easily separable. For the sake of clarity of the presentation, however, in analysis of the strategic decision-making, attention is first paid to the broad aspects of farming and the total economy, and subsequently to the narrower issues of forest management. Finally, some of the attitudes of forest owners toward forestry promotion and cooperation are treated.

First, an endeavour has been made to explore the rationale of farm management by the aid of items B 1, C 12, C 11 and B 3 in the questionnaire (fig. 5, p. 48; appendix 1, pp. 77–93). Question B 1 elucidates the broad objectives of forestry in the farm totality, in the light of *the use of forest income*. The weight put upon the payment

of taxes in the use of income seems the best means of discrimination between the types of farming (7). The payment of taxes is accentuated in problem farming and in prosperous field farming — although presumably for different reasons — but it is considered as a less important item in the use of forest income in labour-intensive family farming. As concerns problem farming, taxes can also be considered as belonging to the necessary, immediate expenses of life that predominate the whole of husbandry. Moreover, the economic possibilities of improving the situation by long range investments (6) are very limited. In the case of prosperous field farming, however, the emphasis laid upon taxes in the use of forest income indicates passive farm management, in which the maintenance, rather than augmentation of the firm economic position achieved (6, 13) forms the primary objective. The old age of the owner (228) may be one of the factors that affect the passive character of farm management (cf. HAUSHOFER 1962, p. 103; YOHO et al. 1957, p. 29). In labour-intensive family farming, the forest income plays a more active role and is also applied to productive investments (13), although the education of children (14) does not seem to be considered one of these. Forestry is here apparently a more integrated part of the farm totality than in other types of farming.

In part-time farming, the employment of forest income is characterized by the preponderance of purposes external to the farm, the improvement of housing (10), and the education of children (14). The more extensive nature of farm management of part-time farming in depressed regions is indicated by the greater weighting of taxes, and the lesser importance attached to the payment of debts in the use of forest income as compared with part-time farming in expansive regions.

The above picture of the rationale of farm management is confirmed by the responses to question C 12, dealing with *competition*

Fig. 5. Factor patterns of variables primarily measuring the rationale of farm management (oblique solutions I and III, appendices 8-9, pp. 108-111)

Kuutio 5. Omistajan kokonaistaloudellisia periaatteita edustavien muuttujien faktorirakenne (vinot ratkaisut I ja III, liitteet 8-9, s. 108-111)

	PF ¹	EPTF	PFF	LIFF	PTF	CF
	4 _I	1 _{III}	5 _I	3 _I	2 _I	6 _I
<i>B1. Use of forest income</i>						
6 for part payments of and interest on debts ...	(-)	(-)	-			
7 for the payment of taxes	(+)		+	-	(-)	
10 for building of dwelling or production houses		(+)			(+)	
13 for draining, electrifying, or other basic improvements			-	(+)		(+)
14 for educating children		(+)		(-)	(+)	
<i>C12. In competition with forest investments</i>						
91 agricultural investments	-	-	-	+		
92 investments outside the farm		+			+	(-)
93 necessary expenses of the family	++					
94 car, TV, travelling etc.	(-)		(+)	-		
95 savings		(-)	(+)	(-)	-	
<i>C11. Best ways of saving</i>						
86 in the bank	+	-			-	(+)
87 in stock in a housing association		(+)			+	
88 in life insurances		(+)		(-)		
89 in other bonds and securities	(-)	+			(+)	
90 in growing stock	(-)			(+)	(-)	-
<i>B3. The ways in which forest enhances the farm value</i>						
19 it increases comfort in the home and offers opportunities for recreation			(+)	(-)		
20 it provides income from sales on the stump	(-)		(-)		+	
23 the soil value rises constantly, for instance, as for building site	-	(-)		(-)		+
116 Accuracy in filling out the questionnaire	(-)	+	-	(+)	+	(-)

1) SYMBOLS:

PF=problem farming, EPTF=extensive part-time farming, PFF=prosperous field farming, LIFF=labour-intensive family farming, PTF=part-time farming and CF=commercial farming.

(+), (-) = loadings of magnitude .10-.19

+, - = loadings of magnitude .20 and over

++ = basic vector in oblique rotation.

with forest investments. In problem farming, and in prosperous field farming, it seems that forest investments do not in the main compete with other investments (91, 92), but with consumption. In the former case, however, the consumption consists of the necessary living expenses of the family (93); in the latter case, the outlay relates to a higher standard of living (94). In regard to prosperous field farming, the accentuation of saving alternatives (95) provides an additional indication of passive security-oriented farm management, although agricultural investments may also be financed by agricultural income (91). In labour-intensive family farming, the investments in forestry

principally compete with other productive farm investments (91).

In part-time farming, forestry primarily competes for investments with the opportunities offered outside farming (92). Particularly in the extensive part-time farming of depressed regions, agricultural investments are regarded as subordinate (91). The variables that explore the use of forest income (B 1), and items in competition with forest investments (C 12) acquire only two small loadings (13, 92) from factor 6_I representing commercial farming. The forestry undertaken in connection with a commercial farm is apparently a quite independent enterprise. It plays a minor

role in the financing, of the farm (13). On the other hand, it is not exposed to competition with investment opportunities external to the farm (92).

Question C 11 relates to *the role of forestry as a way of saving*. It can be understood that bank deposits (86) — as the most liquid form of saving — are preferred in problem farming, apparently with a view to handling the necessary expenses. Saving in growing stock is not accorded as high a position (90). Also in commercial farming, the bank is considered as a superior means of saving. Capital in the form of timber stocks may not be sufficiently flexible for the rapid transactions needed in carrying on commercial farming (86, 90). However, in labour-intensive family farming, the status of forestry is accentuated also as a means of saving (90).

Part-time farmers — often absentee owners — appear to seek more profitable ways of saving than bank deposits (86). They prefer shares in housing associations (87), or other bonds (89). It is also recognizable that in the extensive part-time farming of depressed regions even life insurances that are slightly out of date are taken into consideration as a means of saving (88), and forestry is not neglected (90), contrary to part-time farming in an expansive economic environment, with more manifold opportunities for profitable savings and investments.

Question B 3 explores the different ways in which forest is considered to enhance *the value of the farm*. Three of the six original variables representing alternative responses to the question are included in the factor analysis, viz. the comfort of the dwelling and the opportunities for recreation (19), stumpage income (20) and the possible rise in soil values (23). The role of a possible rise in value of the forest soil (23), as with stumpage income (20), is considered to be of minor importance in problem farming. In all probability the alternatives excluded,

employment and the home use of wood, would have been more emphasized. A similar assumption can be made in regard to labour-intensive family farming (19, 23).

In the case of part-time farming, the importance of forestry to the value of the farm seems to be concentrated on stumpage income (20). In the part-time farming of depressed regions, however, stumpage does not play so great a role. As regards commercial farming, the main attention in forestry seems to be paid to the rise in soil values (23).

The viewpoint that forest raises the comfort of the dwelling and offers opportunities for recreation is most appreciated in prosperous field farming, with the importance of stumpage income simultaneously being at a low level. It is indeed possible that the intangible values of the farm as a location for living and as a source of manifold recreation, is accentuated under the circumstances represented by this factor: prosperity, inherited land, and a traditional agrarian environment (cf. pp. 43–44). This coincides with the experience reported by FARQUHAR (1966, pp. 220). Nevertheless, the responses to this question are linked to some extra degree of uncertainty.¹⁾

The above responses (fig. 5, p. 48) enable drawing the outlines of *the rationale of farm management* in different ecological types of farming.

By reason of the weak economic position, the preponderance of material viewpoints over idealistic ones, and short-term over long-term goals, are the most impressive features of farm management *in problem farming*. All the available resources of the owner are required for *the necessary living expenses*, and accordingly an attempt is made to keep them in the most liquid form. Furthermore, for lack of resources, the possibilities for improvement of the situation by productive investments are quite limited. The small size and remote location of the farm mean that all the functions of forestry,

¹⁾ About 20% of the respondents misconceived the given directions (see appendix 1, p. 80) and checked every alternative as one of the categories, «most important», «next important» and «least important», although only three checks per question were actually requested. This may have been of particular harm in the case of question B3, of which the alternatives are printed on two separate pages of the questionnaire. Furthermore, factor 5₁ in question «prosperous field farming» seems to be associated with the greatest tendency to a wrong way of checking (116). However, no probable «factors of error» resulting from the method of checking could be specified at any stage of the analysis.

timber production, employment, the way of saving, economic reserve and soil value included, tend to remain subordinate in the owner's total economy.

Prosperous field farming is characterized by passive farm management — often with an old owner — in which the main emphasis is laid upon *the maintenance of the prosperity achieved* and the high standard of living. Investments aiming at the further expansion and improvement of the farm economy are thus kept in the background. With the material welfare secured, *the intangible benefits of farming* — including the attachment to inherited land are also conceived of as important (cf. HAHTOLA 1967 a, pp. 19–20; 1969 a, pp. 265, 269). Since agriculture does not need financing from forest income in the favourable natural and economic conditions of this type of farming, the role of forestry principally consists of *maintenance of the high standard of living*.

The leading principle of farm management in *labour-intensive family farming* seems to be that of exploiting *the achievement opportunities offered by the occupier's own farm* to the most effective extent possible. Long-term investments are also favoured by the prospects of continuance of farm ownership over generations. Investments in education may be neglected, however. Forestry is a more integrated part of, and has more manifold functions in the farm totality than in other types of farming. Moreover, as a complementary *line of production*, it serves the farm economy by offering *employment*, a favourable way of saving, and an *economic reserve*.

In part-time farming — including also that of absentee owners, with and without agriculture — the entrepreneurial interest of the owner is mainly focused on *the opportunities of achievement external to farming*. Farming, with forestry predominating, competes with other opportunities as an investment, a means of saving, and as an economic reserve. When in a remote location with unfavourable natural and economic conditions, the absentee-owned farm may often remain a fixed asset given extensive use. Under more favourable conditions, especially in expansive regions, where the owners also tend to be younger, part-time farms possess greater productive importance, and

more intensive and manifold use. Moreover, the conditions for effective timber production are then available. In part-time farming, forestry is in general only loosely integrated with the total economy of the owner.

In the management of a *commercial farm* — typical of expansive regions — the main attention is paid to agricultural production. *Forestry*, even in its role as financier and bank for the farming enterprise, is of *minor importance*. In this case, furthermore, forestry is regarded as a quite independent enterprise, possessing only loose connections with other aspects of farming.

72. The Rationale of Forest Management

The rationale of forest management is studied by means of questions B 7 (best ways of managing forest), B 4 (objectives of silvicultural measures), B 6 (importance of percentage return in investment decisions) and B 5 (things giving a positive picture of a forest owner (fig. 6, p. 51).

In the forest-management strategy (B 7) of both prosperous field farms and labour-intensive family farms, which represent the optimum regions of farming, greater emphasis is laid upon the employment opportunities (38) than upon the search for the most advantageous dates of selling (36). Regular cuttings thus seem to be preferred to speculation with business circles. In the case of prosperous field farming, employment opportunities may principally be required for permanent, paid labour, and probably also for the farmer's own machines, whereas the employment of family labour might be the crucial point in the case of family farming. Intensive timber production (40) is a characteristic of the management strategy in labour-intensive family farms, together with the feature that speculation in forest land does not play any role (37; cf. HAHTOLA 1967 b, pp. 52–53, 64). In prosperous field-farming, moderate exploitation rather than effective timber growing seems to be the leading principle of forest management.

Effective timber production (36,40) is also regarded as the best way of management in part-time farming, in particular, when it is located in a favourable, expansive environment (cf. GUINNEY 1962, pp. 15–17). Employment opportunities, in turn, are not

Fig. 6. Factor patterns of variables primarily measuring the rationale of forest management (oblique solutions I and III, appendices 8–9, pp. 108–111)

Kuvio 6. Omistajan metsätaloudellisia periaatteita edustavien muuttujien faktorirakenne (vinot ratkaisut I ja III, liitteet 8–9, s. 108–111)

	PF ¹⁾ 4 _I	EPTF 1 _{III}	PPF 5 _I	LIFF 3 _I	PTF 2 _I	CF 6 _I
<i>B7. Best ways of managing forests</i>						
36 selling when the price of timber is most favourable		—	(—)	—		+
37 profitable buying and selling of wooded areas	(—)			—		+
38 arranging employment for own labour and machines			+	+	—	—
40 producing as much timber as possible per hectare		(+)	(—)	(+)	+	
<i>B4. Objectives of silvicultural measures</i>						
24 fulfilling the provisions of law			(+)	(—)	—	(—)
25 good tending and augmentation in value of the property	(—)			(—)		
26 securing regular, constant cutting possibilities	(—)		(—)	+	+	—
27 securing cutting possibilities for »rainy days»	(+)	(—)				+
28 fulfilling duty to the society			(+)			(+)
<i>B6. Importance of the percentage return in investment decisions</i>						
34 when buying a wooded area		(—)	(+)		(—)	
35 when starting artificial regeneration	(+)		(+)	(—)		(+)
<i>B5. Things giving a positive picture of a forest owner</i>						
29 fertilization of forests		(+)		(+)	(+)	(—)
30 vigorous young stands	(—)		—		(+)	(+)
31 cleaning of stands				(+)		(—)
32 stands of large-sized trees		(—)	(+)	—	(—)	
33 extensive areas sown and planted			(+)			
116 Accuracy in filling out the questionnaire	(—)	+	—	(+)	+	(—)

1) SYMBOLS:

PF=problem farming, EPTF=extensive part-time farming, PPF=prosperous field farming. LIFF=labour-intensive family farming, PTF=part-time farming and CF=commercial farming.

(+), (—) = loadings of magnitude .10–.19

+, — = loadings of magnitude .20 and over

++ = basic vector in oblique rotation

considered important (38). In the forest management of commercial farming, the main attention is paid to the greatest possible profit on invested capital. The profitable buying and selling of timber stands (37), and cutting when the price of timber is at its peak (36) are then regarded as the best means to this end. Even here, the employment opportunities offered by the forest holding are not held to be important (38).

The motives for silvicultural measures (B 4) in prosperous field-farming and in labour-intensive family farming display distinct divergences. In the former case, the silvicultural measures are mainly conceived as

a duty, imposed by law (24, 28). The viewpoint that silvicultural measures enhance the permanent, sustained opportunities for cutting (26) is considered to be of minor importance. This attitude may be partially attributable to the diminution, in any case, of opportunities for cutting at some period to come, owing to the age-class distribution and lack of young stands harvestable in the near future (cf. p. 43). In family farming, the silvicultural measures are primarily motivated by the increasing opportunities for cutting (26), while the provisions of law (24) and prospects of tending and building up the property (25) do not seem to be influential. In regard to the rationale of

forest management in problem farming, it is recognizable that, although the small woodlot does not offer opportunities for regular cuttings and permanent employment (25, 26), it can, however, play a role as an economic reserve, and offer some incomes when «rainy days» come (27; cf. ZAPF 1960, p. 60). The loading (B 7, 37) which indicates that small-scale farmers do not consider speculation with wooded areas a suitable management strategy for themselves is understandable when their small economic resources are taken into consideration.

The silvicultural measures in the part-time farming of expansive regions — in parallel with those in labour-intensive family farming — are principally motivated by the need to ensure regular opportunities for cutting (26). Provisions of law (23) are not considered decisive. In commercial farming, the silvicultural measures are primarily made with the role of forestry as an economic reserve kept in mind (27, 26) and with awareness of the moral duty to engage in reforestation (28). Forestry is apparently well suited to diminish the risks involved by the specialized production characteristic of commercial farming (cf. HAHTOLA 1967 a, pp. 22–24; 1969 b, pp. 1–2; 1971 a, pp. 116–117). The factor descriptions of the variables concerned with the motives of silvicultural measures (B 4), and the attitudes adopted towards different ways of saving (C 11), indicate the usefulness of keeping separate the roles of forestry as a «bank» and as an economic reserve (cf. ZAPF 1960, pp. 53–60). For example, it is observable from the conditions of problem farming and commercial farming that forestry can function as an economic reserve, even in cases where its capacity to serve as a «bank» and as source of liquidity is inadequate.

On the basis of the behaviour of the variables 34 and 35 (B 6) — chosen to represent the importance of «profitability» in forestry decisions — in the factor descriptions discussed above (pp. 34, 37) the point has been raised that question B 6 reveals *the general interest in forestry investments* rather than the way of calculation adopted by forest owners. It is apparent that the reasons for the willingness or reluctance of individual owners to make investments in

forestry vary in nature (FLORA 1966, pp. 48–53; HERMANSEN 1964, pp. 313–314; LUNDELL et al. 1969, p. 549).

Accordingly, it can be hypothesized on the basis of the factor patterns of fig. 6 (p. 51) that part-time farmers, who do not consider the percentage return on investment a decisive factor, are most interested in the buying of wooded areas (34). Prosperous field farmers thus seem to display the least willingness to increase their forest ownership. In prosperous field farming, unwillingness to make regeneration investments also seems to prevail (35). Pessimistic expectations in regard to the future in general (p. 43) may provide a reason for this. The lack of interest in investments in artificial regeneration is also discernible in problem farming and commercial farming.

Using this line of interpretation the factor pattern further indicates that labour-intensive family farming is associated with the greatest interest in investments in artificial regeneration (35). This fits well with the striving to achieve effective utilization of the productive capacity of the farm, the important status and manifold functions of forestry in the farm economy, and the optimistic expectations in regard to the profitability of forestry (cf. p. 44).

Although the general willingness to invest in forestry may not be wholly explicable by the required rate of interest on investment, the behaviour of variables 34 and 35 can also provide hints on the rent requirements associated with different types of farming. Thus, labour-intensive family farming and part-time farming of both expansive and depressed regions represents a low rate of interest required in forest investments, and the desire for a high rate of interest in the other ecological types of farming, problem farming, prosperous field farming and commercial farming (cf. HAHTOLA 1971 b, p. 12; cf. VIRTA 1970, pp. 22–23).

Question B 5 sheds light upon the forest-management principles of forest owners by exploring *which features of a forest owner they hold as positive ones*. The owners of prosperous field farms and labour-intensive family farms have quite opposite conceptions about a good forest owner. The former appreciate forest property with voluminous stands (32), and fulfilment of the regenera-

tion responsibilities (33)¹), whereas labour-intensive family farmers primarily appreciate the silvicultural measures that are aimed at intensive timber production (29, 31). A positive estimation of features in reference to active timber-growing is also discernible in part-time farming (29, 30). In commercial farming, vigorous young stands are appreciated (30) but not the active measures involved in tending them (29, 31).

The above questions (B 7, B 4, B 6 and B 5) indicate that *the rationale of forest management in problem farms* reveals some kind of duality. Against this, *the short range objective of liquidity* is emphasized with a view to ensuring the necessities of life, although a small wooded area would be more appropriate to *an economic reserve* than regular utilization. In a weak economic position — typical of problem farms — in general the long-range benefits offered by forestry are consequently overshadowed by the more compelling short-range needs. As a result, the required rate of interest tends to be high, and the motivation to engage in forestry investments low (cf. CLAWSON 1957, pp. 521–525).

In prosperous field-farming, the central objective of forest management apparently consists of *contributing to the high living standard*, although a role is also played by the employment of a permanent labour force and machines. In view of the stability of the economic position, and the lack of aim to bring about expansion of the farm business by means of investments involving risks, regular cuttings rather than the function of forestry as an economic reserve seem to be emphasized in forestry management. However, the regeneration is primarily motivated by the provisions of law, and not by ensuring regular opportunities for cuttings. *The scanty interest exhibited in forestry investments* that prevails in this type of farming might result from the pessimistic views of the future profitability of forestry that characterize the forest owners concerned.

In labour-intensive family farming, the

manifold goals of forestry within the farm totality are for the most part striven for by the agency of *intensive tree production and regular cuttings*. Regular cuttings are favoured since forestry plays important roles both as a worksite and as a «bank» employing the farm's own labour force and machinery, and in financing the permanent transactions of farm economy. Regular investments in forestry — artificial regeneration included — are not considered as separate items but as reinvestments of the whole economy of the farm. By virtue of the willingness to engage in forest investments, and the corresponding low rate of interest required, good preconditions for intensive timber growing prevail in this type of farming.

Intensive timber production is also regarded as the primary strategy of forest management also *in part-time farming*, particularly in expansive regions where favourable natural and economic conditions for forestry exist. Regular cuttings are preferred, although as a rule the owners do not take part in forest work. Forestry competes with investment opportunities outside the farm, but it seems that a relatively low requirement in respect of the rate of interest is applied when the purchase of a wooded area is contemplated. It is probable that some imponderable benefits of forest-owning are also taken into account.

The commercial features are also distinctive in the principles of forest management *in commercial farming*. Consideration of the business cycles of timber markets, rising soil values, and the opportunities for speculation, are emphasized (cf. HAHTOLA 1970 c, p. 4). The role of forestry, as *an economic reserve* for the specialized commercial farm, is accentuated. By reason of the high capital requirements of commercial agriculture, a relatively high rate of interest is required when thought is given to artificial regeneration. Intensive timber production, with large investments, may as a result be avoided. Nevertheless, it seems that underproductive stands are not accepted.

¹) In accordance with the interpretative content given to factor 5I, «prosperous field farming», the value attributed to extensive sown and planted areas is here considered as being primarily dependent upon the fulfilment of the provisions of law and moral duty. However, in this case intensive regeneration would be rational and worthy of positive estimation also because of the preponderance of old stands with low increment in the wooded area concerned (see p. 43 and figure 4, p. 42).

Fig. 7. Factor patterns of variables measuring the attitudes of forest owners toward different ways of promoting small-scale forestry (oblique solutions I and III, appendices 8–9, pp. 108–111)

Kuvio 7. Metsänomistajien asennoitumista erilaisiin pienmetsätalouden edistämistapoihin edustavien muuttujien faktorivirakenne (vinot ratkaisut I ja III, liitteet 8–9, s. 108–111)

	PF 4 _I	EPTF 1 _{III}	PFF 5 _I	LIFF 3 _I	PTF 2 _I	CF 6 _I
B8. Best ways of promoting small-scale forestry						
41 enlarging the farm size	(-)	-	(-)	(-)	-	(+)
42 employing more contractors than before				(-)	+	
43 leaving more tasks than before to be done at the expense of the State			-		(-)	
44 leaving more tasks than before to be done at the expense of timber companies				(-)		
45 increasing the joint ownership				(+)		(-)
46 increasing the mutual cooperation		(+)	+	+	(+)	(-)
47 intensifying the training and education of forest owners	+		(+)			

SYMBOLS:
See page 51.

73. Attitudes toward Forestry Promotion

Question B 8 in figure 7 deals with the attitudes of forest owners toward different ways of promoting small-scale forestry. The first alternative — the enlarging of farm sizes (41) — is considered the best way of promotion by the owners of commercial farms. This approach to the problems of small-scale forestry is not, however, supported by the other types of farmers. In particular, the attitudes of part-time farmers seem to be unfavourably disposed towards the enlargement of farm sizes.

The use of contractors (42) derives its main support from the part-time farmers in expansive regions. In turn, labour-intensive family farmers resist the use of contractors, and similarly the transference of the functions of private forestry to the timber companies (44). The increase of State participation in the activities of private forestry (43) is resisted by the prosperous field farmers in particular, but also by the part-time farmers of expansive regions.

By virtue of this factor description, the joint ownership of forests (45) derives some support in labour-intensive family farming, and resistance on the part of commercial farming. The most favourable attitudes towards the cooperation of forest owners as a means in promoting private forestry (46) are found in prosperous field farming and in labour-intensive family farming, which

represent the optimum farming regions. Support is also given by part-time farmers. An indication of resistance to cooperation is discernible in commercial farming.

Vocational training and extension activities (47) are emphasized by problem farmers in particular but also to some extent by the owners of prosperous field farms.

As a conclusion in relation to the means of promotion in private non-corporate forestry, favoured by the different types of farming, it can be said that *problem farmers* — curiously enough — seem to prefer extension and vocational training to the enlargement of farm sizes. *Part-time farmers* are also suspicious of the enlargement of farm sizes but are instead favourably orientated towards the cooperation of forest owners. In expansive regions, part-time farmers also support the use of contractors, but are unwilling to allow the State to attend to additional tasks in private forestry.

In *prosperous field-farming*, cooperation between forest owners is considered the best way of promoting small-scale forestry. It is apparently viewed as the main alternative to the increasing status of public agencies in private forestry (cf. HAHTOLA 1970 e, p. 30). The cooperation of forest owners is also preferred to other ways of promoting private forestry in *labour-intensive family farming*. In this case, however, the cooperation appears principally to be an alternative to those arrangements of pri-

vate forestry in which timber companies and contractors dominate.

Commercial farmers seem to resist both joint ownership of forests and the cooperation of forest owners. They regard the enlargement of farm sizes as the best way to settle the problems of small-scale forestry. The increasing number of part-time farmers is a hampering factor in the attainment of this objective.

74. Attitudes toward Cooperation

The attitudes of forest owners towards cooperation are analysed by the aid of a number of questions, B 11 (fields of cooperation), B 12 (objectives of cooperation), B 9 (obstacles to cooperation), B 10 (decisions most easily delegated), B 13 (forms of delegation) and B 14 (centralization of cooperation; cf. fig. 8, p. 56).

In regard to the *preferred fields of cooperation* (B 11), mention is first due that variable 62, expressing the preferential order of cooperation in growing timber, is the basic vector of factor 1 in oblique solution 1, representing the predispositions of old forest owners. Accordingly, the traditional, old forest owners regard the growing of timber as the most suitable field of cooperation (cf. p. 38). In respect of the attitudes of forest owners in different, ecological types of farming, it is observable in fig. 8 (p. 56) that problem farmers support cooperation principally in drainage work and the building of forest roads (65). However, they are not willing to cooperate in logging or the selling of timber (63, 54). However, if the subordinate position of forestry of problem farms is taken into consideration, it is possible that the farmers have in mind the improvement of agriculture and general communications rather than forestry in favouring the cooperation in drainage work and the building of forest roads. Their resistance to cooperation in logging and selling timber may, in turn, depend upon their willingness to preserve in their own hands the opportunities for employment offered by forest work.

Prosperous field farmers think that cooperation is needed most in logging (64); they do not consider that cooperation in draining and building of forest roads (65)

is of equal importance. When the affluent timber resources and the nature of forest management associated with this type of farming are taken into account, it is understandable that the owners concerned are more interested in cooperation in harvesting than in long-term silvicultural measures. Prosperous field farming may also be associated with good communications and a small proportion of swamps, with the drainage of swamps and the building of forest roads thus being unnecessary. As opposed to prosperous field farmers, labour-intensive family farmers are not willing to cooperate in logging, but primarily in the selling of timber (63,64). They are apparently interested in ensuring the marketing of the small quantities of timber they offer, mainly by means of delivery contracts. It is probable that they are also afraid of losing opportunities for work if they cooperate in logging.

As with labour-intensive family farmers, part-time farmers are not interested in cooperation in logging, and support cooperation in selling (63, 64) but supposedly by different reasons. As generally speaking they are not interested in taking part in forest work, apparently they have other solutions in mind. In expansive regions in particular, part-time farmers may prefer the use of contractors to cooperation in logging. Moreover, it is observable that the part-time farmers of depressed regions also support cooperation in timber growing (62).

Commercial farmers are the least interested in sales cooperation among the different ecological types of farming (63). It is probable that they possess a close acquaintance with the channels of timber marketing, and think that they themselves could do the job best. The prospects available in speculation and the increase in soil values might form the primary motive impelling commercial farmers to cooperate willingly in the drainage and building of forest roads (65), although the objective of forming an economic reserve may also be pertinent (cf. HAHTOLA 1970 d, p.1).

Question B 12 is concerned with *tasks of forest management that would be most appropriate for cooperative action*, in the opinions of forest owners. It is discernible

Fig. 8. Factor patterns of variables measuring the attitudes toward cooperation (oblique solution I and III, appendices 8-9, pp. 108-111)

Kuio 8. Metsänomistajien asennoitumista yhteistoimintaan edustavien muuttujien faktorirakenne (vinot ratkaisut I ja III, liitteet 8-9, s. 108-111)

	PF ¹⁾ 4 _I	EPTF 1 _{III}	PFF 5 _I	LIFF 3 _I	PTF 2 _I	CF 6 _I
<i>B11. Preferred fields of cooperation</i>						
62 raising stands		+				
63 selling timber	(-)	(+)		(+)	(+)	-
64 logging	(-)	-	(+)	-	-	
65 draining and building of forest roads	+	(-)	(-)			(+)
<i>B12. Objectives of cooperation</i>						
66 engagement of permanent labour	-	-	(+)	-		
67 acquiring machines	(-)	-	(-)		-	(-)
68 engaging of forest experts		++			++	
69 arrangement of advance financing	+			+	(-)	(-)
<i>B9. Obstacles to cooperation</i>						
48 lack of qualified leaders				(-)		
49 economic problems					(-)	(+)
50 cooperation diminishes the working opportunities of a single forest owner				(+)		(-)
51 discord between forest owners	(-)		(-)		(+)	
55 fear of losing the power of decision to other interest groups			+			
<i>B10. Decisions most easily delegated</i>						
56 choice of method of treating the forest		+	-		+	
57 choice of time for selling and cutting		(+)	(+)	(-)		(-)
58 choice of buyer						(-)
59 choice between the sale on the stump, delivery sale or cash sale	(-)	(-)			(-)	
60 choice of logging method		-		(-)		+
61 making of agreement of prices				+		
<i>B13. Forms of delegation</i>						
70 one man - one vote	(+)		(-)	+	(-)	(-)
<i>B14. Centralization of cooperation</i>						
73 power of decision in a village organisation		-			-	-
116 Accuracy in filling out the questionnaire	(-)	+	-	(+)	+	(-)

¹⁾ SYMBOLS:

PF=problem farming, EPTF=extensive part-time farming, PFF=prosperous field farming, LIFF=labour-intensive family farming, PTF=part-time farming and CF=commercial farming

(+), (-) = loadings of magnitude .10-.19

+, - = loadings of magnitude .20 and over

++ = basic vector in oblique rotation

that problem farmers and labour-intensive family farmers are not willing to cooperate in the engagement of paid labour (66), as apparently they wish to preserve the work for themselves. Instead, they seem interested in cooperation in advance financing (69), which enables them to perform the logging themselves.

Part-time farmers consider the engagement of forest experts (68) as the most important objective of cooperation among forest owners.

However, they are not willing to take part in the acquisition of machines cooperatively, and particularly in depressed regions they are not interested in cooperative employment of the paid labour required, either (66, 67). Probably, they think that the timber companies and contractors are in a better position to assume the responsibility and risks involved (cf. VIRTA 1970, p. 22). It can accordingly be assumed that the present preponderance of the engagement

of forest experts by the forest management associations — in particular in silvicultural activities — is quite appropriate from the viewpoint of the increasing category of part-time farmers (cf. p. 38; REUNALA and TIKKANEN 1972, pp. 4–5, 7–8).

Prosperous field farmers, and commercial farmers, are particularly interested in cooperation in engagement of the labour force (66). In this they may have logging in mind which calls for the largest input of labour in forestry (HAHTOLA 1970 d, p. 1).

Question B 9 relates to *the obstacles to cooperation*, and shows that prosperous field farmers are first of all afraid that the power of decision in regard to cooperatives may be transferred from the hands of forest owners (55; cf. HAHTOLA 1970 d, pp. 3–4; MÄKELÄ 1971, pp. 38, 44). The interpretative content of factor 5_I indicates that they may have in mind the increasing influence of public agencies, rather than the preponderance of timber companies. Labour-intensive family farmers face the possibility of losing their opportunities for work (50), the major obstacle to cooperation.

In regard to part-time farmers in expansive regions, the most difficult problems encountered when a start is made in cooperation are not financial in nature, but more personal; this particularly applies to the discord between forest owners (49, 51). It can be assumed that in this case the crucial point lies in the divergences in interests of a number of owner-categories. For example, part-time farmers are not interested in participation in forest work, whereas many other forest owners are.

Commercial farmers stress that economic difficulties (49) represent the main obstacles to cooperation among forest owners. If the percentage yield on capital is taken as the only criterion of economic efficiency — as may be appropriate in the forestry of a commercial farm — the heavily mechanized logging systems of timber corporations and contractors are often superior, as the cooperatives — at least in principle — must make efficient use of both the available labour and the capital investment of the participating forest owners (see also HAHTOLA 1971 d, pp. 3–6).

The responses to question B 10 concern *the forest management decisions which are most*

easily delegated to the cooperation agencies. They correspond to the goals of forestry and the objectives of cooperation and preferred fields discussed above. Thus, prosperous field farmers are not ready to delegate the choice of silvicultural practice entirely to the experts (56). It seems that they will themselves decide on the extent of clear cuts of old stands, which entail regeneration expenses. However, they are willing to delegate the decision in relation to the date of cutting (57), probably because forest incomes are rather marginal for their farm economy.

Labour-intensive family farmers — being dependent upon regular forest income — are not willing to allow others to decide on the date of cutting (57) or the logging method (60), as they wish to ensure their own opportunities for work. The fear of logging damage to the remaining stock may also play a role here. As they are principally interested in cooperation in selling timber, they are consequently ready to delegate the settling of prices to the cooperative agencies (61).

Part-time farmers, both in depressed and in expansive regions, are in particular willing to delegate the method of silvicultural treatment to experts engaged cooperatively (56). As for the main part-time farmers are interested only in sales on the stump, they cannot delegate the form of timber contract to others (59). The resistance of part-time farmers of depressed regions to delegate the decision as to logging method (60) may depend upon their fear of logging damage (cf. MÄKELÄ 1971, p. 32), apart from their lack of interest in cooperation in logging (64).

Apparently commercial farmers are principally concerned with getting the logging done, and not with the method of logging. They are thus prepared to delegate this decision (60). However, they will themselves attend to the selling of timber, including the proper date (57, 58). The date of selling may be important to them, as in all probability they will follow the cyclical trends of timber; moreover, as a rule, some special purpose lies behind the desire for forest income as an economic reserve.

Question B 13 provides some insight into the opinions of forest owners on *the form of*

delegation. It is observable that the principle of one man — one vote is particularly supported by labour-intensive family farmers. The problem farmers also seem to favour this method of delegation. In turn, prosperous field farmers, commercial farmers and part-time farmers of expansive regions prefer other bases for the distribution of the power of decision, either the size of the wooded area, or the number of shares (cf. appendix 1, p. 85).

In regard to *the proper degree of centralization* in the organization of cooperation, it is discernible from the responses to question B 14 that in particular modern forest owners— part-time farmers and commercial farmers— are ready to delegate the power of decision from the village level to the higher cooperative agencies.

The features discussed above now enable a general picture to be drawn of the attitudes of forest owners towards cooperation in different socio-economic environments.

By reason of the subordinate position occupied by forestry in the total economy, *problem farmers* do not seem to adopt any definite attitude towards cooperation among forest owners, either for or against. However, they support those cooperative undertakings which bring *immediate economic advantages* to them. Possible differences of opinion between forest owners are then disregarded. On cooperating, *problem farmers* endeavour to *retain for themselves* even the scanty *opportunities for work* offered by their forest holdings. Cooperation in drainage and the building of forest roads may be partly supported to facilitate the clearance of land, and to improve farm communications. The principle of «one man — one vote» — a characteristic of cooperative movement — is supported by the small owners concerned.

Prosperous field farmers seem primarily to keep in mind the engagement of *paid labour for logging* when supporting the cooperation of forest owners. They are not willing to delegate the choice of silvicultural treatment, and the extent of clear cuts of

old stands, entirely to experts. In the organization of cooperation, the prosperous field farmers emphasize maintenance of the power of decision in the hands of forest owners. In regard to the delegation of the power of decision, they do not like the principle of «one man — one vote», but prefer to concentrate the main influence in cooperation with large-scale farmers.

In *labour-intensive family farming*, the cooperation of forest owners is also considered as the best way of promoting small-scale forestry. When they engage in cooperation they wish — as do problem farmers — to *leave the forest work primarily for performance by themselves*. By cooperation, they endeavour first and foremost to *ensure regular marketing* for the timber delivered. They support the principle of «one man — one vote» in the cooperative decision-making.

Part-time farmers are also favourably inclined towards the cooperation of forest owners, although they are sometimes afraid of discord between the participants. In the main, they will *engage experts* on cooperation to attend to *silvicultural activities and timber selling*. In logging, they rely on contractors and timber companies. Part-time farmers are ready to delegate the power of decision to higher agencies of the cooperatives.

In regard to the six ecological types of farming, it seems that *commercial farmers* are least interested in the cooperation of forest owners, apparently for economic reasons. In particular they wish to attend to the sale of timber themselves. *The engagement of paid labour* is, however, the field of cooperation in which they are most willing to participate. They also display some interest in cooperation in drainage and the building of forest roads, although rising land values may play the major role here. When they engage in cooperation, commercial farmers support centralized decision-making, and forms other than the principle of «one man — one vote» in delegation of the power of decision.

8. DISCUSSION

81. On the Research Strategy

As in many other empirical studies, an endeavour is made in this investigation to develop a theory — or at least a rudimentary conceptual scheme — for the explanation of the empirical phenomena concerned, in this case understanding and explaining the behaviour and decision-making of forest owners in a special field. To facilitate evaluation of the theoretical constructs of the study, and the conclusions based upon them, some supplementary comments are made below.

This study comprehends the third stage and way of approach of the present writer to the behaviour of forest owners. On the first occasion (HAHTOLA 1967 a), the main attention was paid to the *farm background variables*, with the focus on the relationships of delivery cuts and the farm totality. In the second stage (HAHTOLA 1967 b), the investigation was mainly concerned with the role of the *socio-economic environment* of farming. In the present paper the principal points of departure are both the *socio-economic environment* and the *value orientations* of forest owners.

As emphasis is laid upon the unguided, on-going nature of social change, the ecological approach of this study, in which private forestry is analysed primarily from the viewpoint of the socio-economic environment, is here termed *materialistic*. When a start is made from the value orientations of forest owners, with the possibility of willed, planned social change kept in mind, the approach — also applied in this study — is consequently termed *idealistic*. In view of the philosophical commitments of the writer, the choice between these approaches is arbitrary, and thus no general order of preference for their applicability is definable (cf. SARIOLA 1972, p. 148). Special research, or the decision situation, should determine their use. *The point is thus voluntaristic* (cf. JUNTUNEN 1971, pp. 15–18).

The arbitrary, voluntaristic position to-

wards different approaches to the behaviour of forest owners may not be in agreement with the prevailing *positivistic tendencies in social sciences*, which claim a priority for some special »real», »objective» or »concrete» basis of all theorizing (cf. MARKOVIĆ 1972, pp. 27–28). One positivistic tradition emphasizes causal explanation and inductive inferences from concrete observational data. According to AHMAVAARA (1970, p. 16), this approach leads to the over-emphasis of unessential problems of detail in the social sciences (cf. NIINILUOTO 1971, pp. 39–41). The positivistic form of Marxism, in turn, stresses wide, extensive theories for whole societies, but actually accepts only one — based upon class-structure and the relations of production — which should reveal the objective course of social phenomena (cf. ALLARDT 1972, pp. 60–61; RANTALAIHO 1972, pp. 5–11; SULKUNEN 1972, pp. 163–166, VON WRIGHT 1970, pp. 26–27). A common feature of both these strategies is that *they claim priority for some materialistic models*, often on ontological grounds. As one consequence, they are opposed to the inclusion of a large number of variables in the empirical analyses, since it is difficult to specify the causal — or other kind of detailed — mechanisms involved when use is made of a large number of variables.

The strategy of the present work shares the above emphasis on general social theories, but implies a belief that *many alternative approaches* are needed in their development. This explorative study does not try to specify the detailed mechanisms, but only to indicate *some general regularities* of the behaviour and decision-making of forest owners by the application of a large number of variables. An inevitable consequence of this strategy is that only a small part of the variance of the variables included in the empirical analysis is explicable. The writer agrees, however, with the conceptions, and maintains that even inexact information on major social regularities can

be more important than exact knowledge of inessential details (cf. DUBOS 1969, p. 165; KUUSI 1962, pp. 16–17; SIMON 1954, pp. 388–394).

As the use of a factor-analytical approach in the social sciences is subjected to a great deal of discussion and criticism, it is worth while to point out the role of factor analysis in this study. Factor analysis is applied here solely as a *method of analysis*, a mathematical description, and an aid to interpretation of the empirical data. No attempt is made to present a factor-analytical theory, or the revelation of «basic dimensions» of the behaviour of forest owners, as psychological *factor theories* of personality and mental abilities, although such a strategy might also be fruitful (cf. VALKONEN 1971, pp. 114–115). This is implied in the procedure adopted in the interpretation and application of the factor descriptions. Equal attention is paid both to the holistic interpretation of factors by analysis of the columns of factor matrices, and to the scrutiny of rows — i.e. variables. In this case, the fact that the researcher is primarily interested in *the direct relationships of variables and groups of variables* rather than in the «basic dimensions», is also indicated by the interpretation of factors being based only on a part of the set of variables and by the subsequent use of these theoretical constructs as an aid to explanation of the behaviour of other variables (cf. HAHTOLA 1967 a, pp. 77–78, 125–126; 1967 b, p. 31; cf. JÄRVELÄINEN 1971 b, pp. 287–289; PÄIVIÖ RIIHINEN 1971, p. 278). Furthermore, the use of different variables in turn as a primary starting point of interpretation — a peculiarity of this study — clearly differs from the factor-theoretical strategy aimed at the construction of «basic dimensions».

In an explorative study of this type, it might be reasonable to try first to specify a group of *relevant concepts and variables*, and leave open the probable mathematical structure of the developing theory. In this situation the factor analysis — as a formal, mathematical device of analysis of empirical observations — offers a possible starting point for theory construction (cf. AHMAVAARA 1957, pp. 14–22; ESKOLA 1971, pp. 321–325; MARKKANEN 1963, pp. 10–11; OLAVI

RIIHINEN 1965 a, pp. 82–88; 1965 b, p. 1–4). In this study it has been employed as an aid in the construction of verbal theories and *typologies of the field* — quite usual approaches in the preliminary level of scientific systematization. From this viewpoint, with factor analysis taken as a mere method of analysis, it is difficult to consider it as an obstacle for theorizing in the social sciences, as is sometimes stated. It does not impose any undue formal restrictions upon the theories to be developed (cf. SULKUNEN 1972, pp. 160–164). The fact that it can effectively handle a large number of quantified variables may not be a handicap, but an advantage to theory construction (cf. RANTALAIHO 1972, pp. 9–11; SARIOLA 1972, pp. 145–147). It seems that some of the criticism of factor analysis has arisen from the confusion of factor-analytical theory and the method of analysis.

The situation assumes a different aspect when a researcher proceeds deductively from *a theory of a special mathematical and logical form*. This is quite a normal case in the social sciences, by reason of the ideals of mathematically-formulated causal theories originating in classical physics and neoclassical economics. The empirical stage of a study then comprises no more than the estimation of parameters of the specific mathematical model (cf. AHMAVAARA 1957, pp. 11–12). In this case, the method of analysis is bound up with the formal and logical — i.e. causal — structure of the subject-matter theory concerned. Consequently, factor analysis is not appropriate to this research situation (see BLALOCK 1964, pp. 167–169, 183; COLEMAN 1964, pp. 20–21). Of course, other methods are needed for the computation of regression coefficients, or the estimation of parameters for an econometric model.

However, the most weighty arguments against the use of factor analysis seem to be based upon the special *ontological conception of causality*. Instead of considering the causal theories and models as pure conceptual schemes for the cognitive control of empirical phenomena (cf. SARIOLA 1961, pp. 37, 41, 50–51; SCHEFFLER 1969, pp. 23–24), the empirical reality is often regarded as being arranged according to these causal models. According to BLALOCK (1964, p. 15):

»... it will probably be extremely difficult for most persons, including the present writer, to get along without the aid of a metaphysical assumption to the effect that something akin to causal laws operates in the real world and not just in the hypothetical models of the scientist. But such an assumption amounts only to a »pious opinion» and cannot be demonstrated by any methods presently known.» (see also BLALOCK 1964, pp. 9–11, 14–21, 27–30; SULKUNEN 1972, pp. 162–166; VALKONEN 1972, pp. 30–32).

If this conception of causality is taken as a point of departure and priority is given to causal models by reason of their »reality», then little use remains, in fact, for factor analysis. A researcher with a voluntaristic standpoint to the basic assumptions of the different research strategies tends instead to accept various alternative approaches to his field of research, and to find ample use even for factor analysis (see JUNTUNEN 1971, pp. 15–18).

82. On the Methodological Setting

Before a summary is made of the conclusions drawn in this study mention is due of some features of the empirical material, as they have probably affected the results.

The low validity of variables — particularly those concerned with opinions — has already been referred to as a possible cause of the low communality in factor analyses (cf. p. 28). Furthermore, the form of some questions, in which the respondents are compelled to *prearrange the given alternatives* (cf. appendix 1, p. 80) tends to accentuate the differences between alternatives. However, this may not be deleterious to factor analysis which presupposes only ordinal measurement (AHMAVAARA 1958, pp. 59–63).

Another consequence of the prearrangement of fixed alternatives — *the technical correlations* produced between them — has been even more extensively discussed in the literature relating to factor analysis (see OLAVI RIIHINEN 1965, pp. 98, 217; THURSTONE 1961, pp. 63, 411–442; VALKONEN 1971, pp. 23, 61). It is apparent that the possibility of the appearance of »factors of error» increases when use is made of technically-correlated variables. As technically-

correlated variables have not had any deleterious effect on the previous works of the present writer, and no factors of error have come to light, on this occasion no attempt has even been made to exclude technical correlations (see also HAHTOLA 1967 b, pp. 40–41). If *variables with high reliability and validity* are also included in the analyses, they serve as *useful benchmarks for the identification of possible factors of error* and for specification of *the content of variables with low validity*. In particular the concrete farm background variables are considered as having this function in the present study (see VALKONEN 1969, p. 68).

Mention is further due that factor analysis does not provide direct information on *the frequency of the types of farming or the value orientations* of forest owners, based upon the functional unities of variables observable from the factor descriptions. Since in this study the empirical material used was not intended to represent any given wide population, the computation and use of factor scores was not considered reasonable at this stage. It may also be stated that, although the factor-analytical study of relationships of variables may not require a strictly representative sample, *the possibility of complete selection* in respect of some essential variables must, owing to the method of data collection, be borne in mind in evaluation of the conclusions of this study (cf. p. 43; THURSTONE 1961, pp. 469–472). Earlier reports have been made on some conclusions based upon the means and frequencies of some opinions treated in this study (HAHTOLA 1970 b, 1970 c, 1970 d, 1971 d).

In evaluation of the results of a study, the main attention in explorative factor analysis is directed at *the coherence and mutual fitting of the interpretations*, a characteristic of the hermeneutic approach (cf. pp. 24–25). It can be said that the factor descriptions of this study, interpreted as types of farming in different socio-economic environments, correspond rather well with the previous interpretations of factors derived from the aggregate data of communes in Etelä-Karjala forestry board district (HAHTOLA 1967 b, pp. 63–65). Moreover, *many details of the factor descriptions are in close agreement with a priori hypotheses*,

although many interpretations still remain quite *tentative*. This especially concerns the value orientations — the normative rationale of decision making of forest owners — because both the theoretical work and the empirical exploration of this field are still at an initial stage.

As a whole, the rather coherent interpretation of the factors of this study — despite the low communality — might be considered as a demonstration of the *tenacity of the strategy of explorative factor analysis in singling out the most systematic variance* of a large set of variables with heterogeneous validity and reliability (cf. HAHTOLA 1967 a, pp. 36–39). The frequent characterization of the results of factor-analytical studies as «trivial» points also to this property of the method (cf. VALKONEN 1971, p. 117).

83. On the Application of Results

Although the major impetus for this study comes from the field of practical extension of private forestry, the objectives of the work are solely theoretical (cf. pp. 7–8). Consequently, the offering of an immediate solution to any special practical problem has not been designed or aimed at. I believe, however, that the extension of private forestry would be best served by the theoretical development of the field.

Some possible fields of application for the results of the study are briefly discussed here. A crucial objective in Finnish forest policy — the acquisition of raw material for the woodworking industries — is taken as the starting point. In the light of this study, what prospects are available for the improvement of 1) *intensive timber production* and 2) *regular timber supply* by private forests? It is practicable to evaluate the conditions under which the business-economic goals of forest owners are in closest harmony with these forest-political objectives, and also what consequences are entailed by the different ways of promoting small-scale forestry in respect to these objectives.

It seems that *the best preconditions both for intensive timber growing and for regular supply prevail in «labour-intensive family farming»*. Owing to the manifold functions

of forestry in the farm totality, the participation of the farm's own labour and machinery in the work in the forest area, prospects of continuance of the farm ownership by heirs, and optimistic expectations in regard to the profitability of forestry, the objectives in view are in close agreement with the management targets of the owners concerned. The «part-time farmers» concerned in the study — including both farmers with noteworthy subsidiary enterprises and absentee owners — also seem to have rather good preconditions, willingness, and economic resources for timber production and relatively stable supply. However, it must be recognized that part-time farmers apparently form a rather heterogeneous group, and that only those forest owners who have engaged in forest management planning have been included in the study (cf. p. 43; HAHTOLA 1964, pp. 482–284; JÄRVELÄINEN 1971, pp. 51, 57, 69; REUNALA and TIKKANEN 1972, pp. 4–5, 7–8, 28). Furthermore, «prosperous field farming» is associated with features that indicate some interest in participating in forest work, and correspondingly in regular cuttings, although in this type of farming the timber-growing may be hampered by an excessive proportion of old stands, and reluctance to engage in their regeneration.

If consideration is given to the on-going social change, it can be expected that the problems often found to be associated with small-scale farming — poor forest management and inadequate stock by reason of overdone cuttings (cf. HAHTOLA 1967 b, p. 65) — are decreasing in parallel with the diminishing number in this category of owners. Consequently, *the perspectives in timber-growing may be rather good*. Nevertheless, the number of forest owners interested in the opportunities for employment offered by their forest holdings and, correspondingly, favouring *regular cuttings*, tends to decline. Instead, the features of «commercial farming» in which forestry functions primarily as an economic reserve, may be increasing in private forestry, conducing to more marked fluctuations in timber supply than before. From this point of view, measures to facilitate the manifold participation of forest owners in forest work — apart from price policy measures

— would be well justified for stabilization of the timber market.

On appraisal of the possible consequences of the enlargement of sizes of farm for timber supply, the crucial point is that of the category of owners which will possess the enlarged forest holdings. The on-going social change mainly indicates the transference of forests from »problem farming» to »part-time farming». This change may improve the conditions for timber growing, but hardly the regular supply. In consideration of the increase in forests classified as »prosperous field farming», »labour-intensive family farming» or »commercial farming» as possible alternative objectives of forest policy, it seems that only an increase in the features of »labour-intensive family farming» would enhance both intensive timber growing and regular supply.

As regards the cooperation of forest owners as a means for the promotion of small-scale forestry, it is observable that this alternative is principally supported primarily by »labour-intensive family farmers», »prosperous field farmers» and »part-time farmers». It is apparent that the owner categories concerned have different forms of cooperation in mind. »Part-time farmers» appear to be mainly interested in the engagement of experts cooperatively, to attend to timber

sales and silvicultural measures, but they prefer to leave logging to contractors or timber companies. Again, timber growing may be facilitated by this form of cooperation, but hardly regular supply. »Prosperous field farmers» — as is the case with »commercial farmers», if they participate — regard the engagement of a permanent labour force as the main objective of cooperation. It can be assumed that an increasing permanent labour force for private forests, engaged by forest owners or their cooperatives, would increase the interest of timber suppliers in regular cuttings and stable timber prices. It is probable that such arrangements would also increase the motivation for timber-growing, by reinforcing the position and prospects of private timber production. In the case of »labour-intensive family farming», forest owners would first of all ensure regular marketing for the timber they supply in cooperation, but would also themselves take part in forest work. Following this line of argument, it can be stated that if intensive timber growing and the regular supply of raw wood are taken as objectives, such forms of cooperation, in which the forest owners direct, and by the use of labour and machines made available by their cooperatives, take part in forest work, would be worthy of support.

9. SUMMARY

91. Approach of the Study

911. Forest-Political and Philosophical Points of Departure

The fact that about 60 % of the total forest area of Finland is owned by non-corporate private owners, and managed in about 300 000 independent units, makes *private forestry a central issue of Finnish forest politics*. Systematic efforts to acquire information on this heterogeneous group of forest owners have been increased during the last ten years. In this study, carried out in the Forestry Department of the Work Efficiency Association (Työtehoseura), an empirical investigation is made of *the rationale of decision-making by forest owners in regard to management, cooperation and the promotion of private forestry*.

Research, the construction of theories in relation to forest owners' objectives, attitudes and the other rationale of decision-making, presuppose the adoption of some stand with respect to the philosophical status of mental variables. The three alternatives: 1) the reduction of mental phenomena to physical ones, 2) stipulation of the separate realms of mental and physical phenomena, and 3) the inclusion of mental and physical phenomena in the same constructs — as in cybernetics and system theoretical thinking — are discussed. The principles of the third approach, implying *an equal philosophical status of mental and environmental variables*, and the combination of both causal and teleological aspects of human behaviour into the same theoretical constructs, are taken as the philosophical starting points of the study. The models used are considered to be *formal*; this allows of *both idealistic and materialistic interpretations*. No general priority is claimed for mental or environmental variables, teleological or causal explanations.

912. The Theoretical Framework

It is thought that both idealistic and materialistic explanations of the behaviour

of forest owners are of value in the research situation concerned; consequently, they are both applied in the study. In regard to *idealistic approaches*, discussion is concerned with the conceptualizations of decision making in the behavioural theories of the firm, and the hierarchical decision schemes of OZBEKHAN (1969) and NICOSIA (1966). The hierarchical scheme of *normative* (policy-making), *strategic* (goal-setting) and *operational* decisions and the parallel inner states of decision-makers, *predispositions, attitudes and motivations*, are used as frameworks in analysis of the influence of forest owners' mental variables upon decision-making. Although the approaches suggested by OZBEKHAN and NICOSIA presuppose feedbacks from the material environment to the mental states of the decision-maker, they can be characterized as idealistic, since they stress the mental variables of decision-making, and the planned, guided change in environment.

The explanation of the behaviour and decision-making of forest owners by *socio-economic types of farming* based upon regional differentiation represents *the materialistic approach* in this study. Although the theory of cumulative growth and regional differentiation developed by MYRDAL (1957) and OLAVI RIIHINEN (1965) emphasizes the circular causation of economic and social factors, the central position of an unguided, on-going process of industrialization and concentration provides this approach with a materialistic impression. The materialistic aspects are also accentuated in the studies of forest owners' behaviour as a result of the central role played in forestry by the physical properties of soil and climate.

913. The Methodological Setting

The empirical material of the study is derived from postal inquiries made to 338 *forest owners* in the districts of two forestry boards, Pohjois-Karjala and Uusimaa-Häme. The former is located in a depressed

area of east Finland, and the latter in a very expansive area of south Finland, in the neighbourhood of the capital. The forest owners included in the sample had recently taken part in *forest management planning* and were, accordingly, assumed — to a greater extent than the others — to be aware of their forest management objectives, and thus capable of answering questions concerned with the rationale of their decision-making. The empirical material was thus not designed statistically to represent a given population, but only to reveal the relationships of the decision variables concerned. However, when conclusions are drawn it must be recognized that by virtue of the method of data collection the forest owners analysed in this study are probably *more interested in long-term forestry than average forest owners*.

Attention in the empirical analysis is restricted to *normative and strategic decisions*. The questionnaire is thus not tied up with single decisions or concrete decision-situations, but relates to the general rationale of a large group of stipulated decisions, or types of decisions. In addition to variables that explore the value orientations and objectives of forest owners, the empirical material concerns characteristics of the farm, forest holding and the owning family. Finally, the variables of the study include factor scores that represent the social structure of the corresponding communes.

Explorative factor analysis is used as the method of analysis, partly because it has holistic and hermeneutic features analogous to cybernetic and system-theoretical thinking earlier preferred. The whole schemes rather than the details — causal or teleological — are emphasized in the theoretical constructs, and the interpretation proceeds in a hermeneutic circle between the wholes and details. No factor-analytical theory of forest owners' behaviour is aimed at. The method is used only as a mathematical device in the construction of typologies that represent the value orientations of forest owners and the farming in different regional conditions.

The strategy of explorative factor analysis allows of and even presupposes *a large number of variables*. However, computer capacity involved restriction to about one

half of the total number of available variables of the study, exceeding 200. The 100 variables included in the final factor analyses were chosen by the aid of two preliminary analyses, using the communality and complexity of the variables as the main criteria. *The total communality* in the final analyses, using 6–15 dimensions, represents 18–31 % of the total variance. The factor-descriptions, interpretable either as *value orientations* of forest owners, or as *ecological types of farming*, were principally sought by orthogonal varimax solutions and oblique cosine solutions (MARKKANEN 1963) as the methods of rotation. Since only those factors that correspond to the theoretical framework were chosen for application in the study — not all the factors from the multi-dimensional solutions concerned — the procedure resembles *a halfway stage between a formal and a theoretically-directed rotation*.

Notwithstanding the low total communality of the factor-descriptions used, indicating the low validity and reliability of many variables, relatively clear and coherent interpretations could be given to the factors. The concrete farm-background variables, and the ecological factor scores, serve as valuable benchmarks in the interpretations. The socio-economic types of farming treated in the study fit quite well with previous investigations, and currently seem to be rather far established. Nevertheless, the value-orientations of the forest owners are more tentative in nature. As a whole, the experience gained in the employment of explorative factor-analyses seem to prove *the efficiency of this method in singling out the most systematic, and consequently the most reliable part of variance of even very heterogeneous variables*.

92. Normative Bases of Decision-Making by Forest Owners

921. Dimensions of Predispositions

Definition of the dimensions of forest owners' predispositions is based upon the 15-dimensional varimax solution in which the variables that represent general values and expectations are principally structured to form 3 factors, interpretable as »prefer-

ence for subsistence economy», «attachment to land» and «resistance to change». In the more condensed 6-dimensional varimax solution, the first two of these factors are combined into one — «traditionalism» — depicting the value-orientations of old forest owners. This factor is also employed in the study. However, it should be realized that, taken in opposite directions, these factors would refer to modern predispositions.

The predisposition called «*preference for subsistence economy*» is characterized by reliance on one's own resources, and esteem of economic freedom, but commitment to social control. Consequently, Gemeinschaft-type organizations with mechanical solidarity may be preferred to formal organizations. Esteem of subsistence economy increases with diminishing size of the farm, and with the increasing age of the owner.

«*Attachment to land*» expresses the esteem of agrarian occupations and landowning, and belief of the continuance of the farm ownership. This predisposition also stresses the non-monetary values involved in farming, and the moral obligation to utilize the whole productive capacity of land. Intensive forestry is not, however, emphasized to an equal extent.

«*Resistance to change*» implies pessimistic expectations in regard to social change in general, and the prospects of forestry in particular. It is associated with prosperity, and the willingness to secure and maintain rather than to augment it. Affluent forest resources seem to constitute an essential part of the agricultural wealth concerned.

«*Traditionalism*» — with features of both «*preference for subsistence economy*» and «*attachment to land*» — emphasizes unanimity and social control, hard work, economic freedom and esteem for agriculture, landowning and land utilization. The connections of forestry with the farm totality are rather weak. Silviculture is considered to be rather a collective responsibility than a private issue.

922. Predispositions in Different Ecological Types of Farming

In the 6-dimensional oblique solution, 5 factors resemble the ecological types of

farming treated in some earlier investigations; the sixth corresponds to the value-orientations of old forest owners. These 5 factors are interpreted as «*problem farming*», «*prosperous field farming*», «*labour-intensive family farming*», «*part-time farming*» and «*commercial farming*». By the use of two slightly different versions of «*part-time farming*», appearing in different oblique solutions, the following 6 ecological types of farming were taken as the starting points in the analysis of decision-making by forest owners in different socio-economic environments. In regard to *the normative bases of decision-making*, the following predispositions are apparent in these ecological types.

The characteristics of «*problem farming*», accentuated in remote, depressed regions, consist of insufficient earnings, offered by small farms with possible subsidiaries, and a low standard of living. As a result *materialistic factors* — the necessities of life and economic realities — are considered to be decisive in decision-making, overshadowing the emotional viewpoints, say attachment to land and the traditions of the social group.

«*Extensive part-time farming*» represents the circumstances in depressed regions, in which the subsidiaries of industrial and commercial occupations, and absentee ownership of farms, have been increased. As the livelihood is not primarily dependent upon small-scale farming, a *moderate attachment to land*, willingness to maintain the tenure of the farm, and *optimistic expectations* of the future are again discernible.

«*Prosperous field farming*» in similarity to the following «*labour-intensive family farming*», represents intermediate socio-economic environments in which neither depressive factors nor strong spread effects act. The prosperity of farming is indicated by good conditions for field cultivation, affluent forest resources, and a high standard of living. The predispositions associated with this ecological type of farming resemble the characteristics often ascribed to Finnish village-settlement regions, comprising *attachment to land*, *economic independence*, *strong social control*, and *resistance to change*.

«*Labour-intensive family farming*» is

characterized by the effective utilization of the productive opportunities offered by the occupier's own farm, and the close combination of agriculture and forestry. As compared with the previous type, it implies weaker social control, no stressing of economic independence, and a more moderate attachment to land.

»Part-time farming» is also accentuated in expansive regions, when the competition in land use is weak by reason of the strong pull-effects of the neighbouring centres in relation to their spread effects. It is characterized by a modern, urbanized value orientation. The pressure toward conformity, and the striving to achieve economic independence, are weak, values attached to land have lost their appeal, and the ongoing social change is experienced as an acceptable, positive phenomenon.

»Commercial farming» is concentrated particularly in environments with high regional development and expansive spread effects, surrounding the industrial and trade centres. It resembles »prosperous field farming», in respect of large farm size and line of production, with field crops predominating, but it is even more mechanized. The predispositions associated with this type of farming correspond to commercial enterprises in the lack of attachment to land, and by accentuation of the monetary values of farming.

93. Strategic Decision-Making

In the analysis of strategic decision-making, both the predispositions of forest owners and the socio-economic environment are taken as points of departure. However, it should be borne in mind that the predispositions indicated in this study to some extent combined with some material conditions, such as the age of the owner, the size of the farm, and the economic environment.

931. The Rationale of Management

The rationale of management associated with »preference for subsistence economy» partly demonstrates that this predisposition is accentuated in small farms owned by

old farmers; management of this type is characterized by the minimum use of money, with the payment of taxes representing the most crucial point in financial matters. The necessities of life predominate in husbandry, and investments are avoided if possible. Forestry is regarded in the same way as mining; thus, cautious exploitation is the leading principle of its management. Silvicultural measures are principally motivated by the provisions of law.

»Attachment to land» is associated with management which aims at more active production than in the previous case, and with the willingness to make investments. However, the striving to utilize the growing capacity of land is based more upon traditions than upon strict economic thinking, and does not concern forestry. The main attention is focused on agricultural production; recognition is however given to the role of forestry in providing a place for work and an economic reserve.

»Resistance to change» is manifested in management by the avoidance of risk and long-term investments, and the regard given to high liquidity. Forestry principally represents an economic reserve and a source of liquidity.

The predisposition termed »traditionalism», which represents the value orientations of old forest owners, provides a basis for the detection of some changes that may be in progress in the rationale of farm management, along with the generation shift in the research area. Accordingly, the remnants of subsistence economy will disappear. According to the norms of the younger generation, the ideal farm manager should be willing to accept risks and enterprising, rather than saving and hardworking. The attachment to land will diminish, and the willingness to move to new occupations increase. Forestry is becoming an equal and more integrated part of the farm enterprise, with more manifold functions than before.

In »problem farming», which represents the first of the six ecological types of farming included in the study, all the available resources are needed — in the most liquid form — to secure an everyday livelihood. Consequently, it is extremely difficult to raise capital for investments which would

mean long-term improvement in the situation. Nevertheless, the small forest holding would be more appropriate as an economic reserve than as a source of liquidity requiring regular cuttings. As a result, the long-term benefits offered by forestry tend to be overshadowed by the compelling short-term needs, and the motivation to make investments in forestry tends to be negligible.

«*Prosperous field farming*» — often with an old owner — is characterized by passive management, aimed in particular at *the maintenance of the prosperity achieved* and a high standard of living, including the intangible benefits offered by the inherited farm. Further expansion and improvement of the farm, and investments that involve risks, are avoided. The central objective of forest management apparently consists of contributing to the high living standard, although a role is also played by employment of a permanent labour force and machines. As expectations in regard to social change and the profitability of forestry are pessimistic in nature, silvicultural measures are mainly motivated by the provisions of law and social responsibility.

The leading principle of management in «*labour-intensive family farming*» is that of utilizing as effectively as possible, *the opportunities of achievement offered by the occupier's own farm*. Productive investments are emphasized, although investments in education may be neglected. The main endeavour to attain the manifold objectives of forestry, as an integrated part of the farm totality, is made by intensive timber-growing and regular cuttings. Apart from it being a line of production and an economic reserve, forestry has important roles as a place for work and as a bank, by enabling employment of the farm's own labour force and machinery, and by contributing to the financing of the regular outlay of the farm. Investments in forestry are facilitated in that apparently they are not considered as separate, but as regular reinvestments by the farm.

In «*part-time farming*» — including absentee owners with and without agriculture — farming with forestry predominating mainly competes with *the opportunities available external to the farm*, as an investment, a means of saving, and as an economic reserve. If

located in a remote position, with unfavourable natural and economic conditions, the part-time farm — in particular that absentee-owned — often remains a fixed asset given extensive use. In expansive regions, where the owners also tend to be younger, part-time farms have a greater productive importance, with more intensive and manifold use. Intensive timber production is the major objective of forest management, although the intangible benefits of forest-owning are also taken into account.

In the management of «*commercial farming*», the main attention is paid to *agricultural production*. Forestry is a quite independent enterprise, principally serving the specialized farm as an economic reserve and with the functions of forestry as a «financier» and a «bank» assuming minor importance. The commercial orientation of forest management is indicated by the careful consideration of business cycles of timber markets, rising soil values, and the opportunities for speculation in wooded areas. The rate of interest required in forestry seems relatively high, which may preclude large silvicultural investments, but also provide an impulse for the regeneration of underproductive stands.

932. Attitudes toward Forestry Promotion and Cooperation

The predisposition «*preference for subsistence economy*» is associated with a *negative attitude toward forest owners' cooperation* as a means of promoting small-scale forestry. In particular, cooperation in selling timber, in drainage and the building of forest roads, and in the engagement of forest experts, are resisted by the forest owners concerned. These forms of cooperation may be regarded as formal organizations which impose too great restrictions upon the managerial independence of the participants.

«*Attachment to land*» seems to imply resistance to those arrangements in the promotion of small-scale forestry which increase the influence of timber companies in private forestry. The forest owners concerned are obviously afraid of losing opportunities for employment of their labour and machines. A similar line of argument may operate when forest owners with a keen

attachment to land are not disposed to delegate to cooperation agencies the decisions that influence the employment of their labour force and transport capacity.

«*Resistance to change*» is associated with stressing the cooperation of forest owners as the best means of promoting small-scale forestry. In view of the pessimistic expectations connected with this value-orientation, it can be assumed that cooperation is conceived as a kind of emergency measure. Such forest owners are mainly concerned with the common engagement and use of wage-labour, with no role being played by their participation in forest work. The most serious obstacle to cooperation is regarded as the difficulty entailed in maintenance of the power of decision in the hands of the forest-owners themselves.

«*Traditionalism*» — characteristic of old forest owners — seems to imply negative attitudes toward cooperation, joint ownership of forests, and the increasing use of contractors in private forestry. Instead, a favourable attitude is adopted towards those alternatives of promoting small-scale forestry that do not restrict the managerial independence of the individual forest owners — such as enlargement of farm size and extension work. Traditionally-orientated forest-owners consider the growing of timber as the most feasible field of cooperation; in turn, cooperation in selling timber is the most strongly resisted form of cooperation. The traditions of the common utilization of forests, and the central role of silvicultural activities in Finnish extension organizations, may be factors that exercise an influence here. These observations lead to the assumption that *the preconditions for cooperation by forest owners and its extension to marketing, are improving with the generation shift.*

In regard to the attitudes of forest owners apparent in different ecological types of farming, it is observable that «*problem farmers*» — curiously enough — prefer extension and vocational training to the enlargement of farm size in the promotion of small-scale forestry. In forms of cooperation, they wish to reserve for themselves the working opportunities offered by their forest holdings. Cooperation in drainage and the building of forest roads is supported; this

may additionally be prompted by facilitation of the clearing of land and improvement in farm communications. The small farmers concerned maintain a one man — one vote principle in cooperation.

«*Prosperous field farmers*» support cooperation by forest owners, and consider it as the main alternative to the increasing role of public agencies in private forestry. They regard *the engagement of paid labour for logging* as the most important objective of cooperation, but are not willing to delegate the choice of method for silvicultural cutting and the extent of clear cuts of old stands entirely to experts. In regard to the organization of cooperation, these forest owners are afraid of losing the power of decision to other interest groups. In delegation of power of decision they prefer forms of delegation other than the principle of one man — one vote.

The cooperation of forest owners is also preferred by «*labour-intensive family farmers*» as a means of promoting small-scale forestry. In particular, they seem to resist arrangements in private forestry in which contractors and timber companies dominate. In similarity to «*problem farmers*», they wish themselves to take part in works on their forest holdings. First and foremost they endeavour by cooperation to ensure *regular marketing* opportunities for the timber supplied. These forest owners support the principle of one man — one vote in cooperation.

«*Part-time farmers*» resist the enlargement of farm sizes as a means of promoting small-scale forestry. Instead, they hold favourable views of cooperation between forest owners, although they are afraid of discord between the participants. They are mainly interested in the cooperative *engagement of experts* to attend to timber sales and silvicultural activities. In logging, they rely upon contractors. The part-time farmers concerned are ready to delegate the power of decision from the village level of the cooperatives to higher agencies.

Of the ecological types of farming included in this study, «*commercial farmers*» are the least interested in the cooperation of forest owners, and in the joint ownership of forests. In their opinion, *the enlargement of farm sizes* would be the best way of settling the problems of small-scale forestry. The differ-

ing interests of commercial farmers and part-time farmers are obvious in respect of the enlargement of farm sizes. If they take part in cooperation, the commercial farmers concerned give priority to the *engagement of paid labour*. They also show some interest in cooperative drainage and the building

of forest roads, but in this case rising soil values may play the major role. These forest owners support the centralization of the power of decision in cooperation, but do not regard one man—one vote principle as a proper method of delegation.

mean alternative to the increasing role of public agencies in private forestry. They regard the engagement of paid labour for forestry as the most important objective of cooperation, but are not willing to delegate the choice of method for silvicultural cutting and the extent of clear cuts of old stands entirely to experts. In regard to the organization of cooperation, forest owners are afraid of losing the power of decision by other interest groups. In delegation to power of decision they prefer form of delegation other than the principle of one man—one vote.

The cooperation of forest owners is also preferred by those numerous family farmers as a means of promoting small-scale forestry. In particular, they seem to regard means in private forestry in which contractors and family commercial farmers wish to participate. In this respect, they wish themselves to take part in work on their forest holdings. First and foremost, they endeavour to cooperate to ensure regular marketing opportunities for the timber and fuel. These forest owners support the principle of one man—one vote in cooperation.

Part-time farmers feel the enlargement of farm size as a means of promoting small-scale forestry. Instead, they hold favourable views of cooperation between forest owners although they are afraid of a record between the participants. They are mainly interested in the cooperative engagement of labour to attend to timber sales and silvicultural activities. In regard to the power of decision, the part-time farmers concerned are ready to delegate the power of decision from the highest level of the cooperative to public agencies.

Of the ecological types of farming included in this study, commercial farmers are the least interested in the cooperation of forest owners, and in the joint ownership of forest. In their opinion, the engagement of labour and the best way of selling the timber of forest roads, but in this case rising soil values may play the major role. These forest owners support the centralization of the power of decision in cooperation, but do not regard one man—one vote principle as a proper method of delegation.

in the best means of promoting small-scale forestry. In view of the present state of forestry, cooperation with this view of forestry can be assumed. The cooperation of forest owners is a kind of emergency measure. Small forest owners are mainly concerned with the common engagement of paid labour with no long being played by their participation in forest work. The most serious obstacle to cooperation is regarded as the difficulty of finding in many branches of the power of decision in the hands of the forest owners themselves.

Cooperation in small-scale forestry is characterized by the fact that forest owners do not wish to delegate the power of decision to experts. In regard to the organization of cooperation, forest owners are afraid of losing the power of decision by other interest groups. In delegation to power of decision they prefer form of delegation other than the principle of one man—one vote.

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SELOSTE

METSÄNOMISTAJIEN PÄÄTÖKSENTEON PERUSTEET

Tutkimuksessa valaistaan metsänomistajien yksityistaloutta, metsätalouden edistämistä ja yhteistoimintaa koskevaan päätöksentekoon vaikuttavia mentaalaisia ja ympäristötekijöitä. Mentaalisten tekijöiden kohdalla erotetaan yleisluonteisina arvoluttuvuuksina »omavaraisuus», »agraariset arvot», »muutoksen vastustaminen» ja »perinteellisyys». Tarkasteltaessa ympäristön vaikutusta päätöksentekoon metsänomistajien yksityistaloudet tyytittellään maatilatalouden taloudellis-sosiaalisen ympäristön, luonnonedellytysten ja tilakohtaisten tekijöiden perusteella. Tyytittelyssä edustavat supistumisalueita »ongelma-maatalia» ja »ekstensiivinen osa-aikatila», lähinnä välimaastossa esiintyviä maatilatalouden optimialueita »vauras peltoviljelytila» ja »työntensiivinen perhetila» sekä talouselämän laajenemisalueita »osa-aikatila» ja »kaupalli-

nen maatalia». Huomiota kiinnitetään etenkin metsälön merkitykseen erityyppisissä yksityistalouksissa työllisyyden ja maksuvalmiuden kannalta, säästämiskohteena ja taloudellisenä reservinä sekä tästä aiheutuviin eroihin puuntuotannon voimaperäisyydessä, raakapuun tarjonnan tasaisuudessa sekä omistajan asennoitumisessa yksityismetsätalouden erilaisiin edistämistapoihin ja yhteistoimintamuotoihin.

Aineisto on kerätty postikyselyllä vuodenvaihteessa 1968—69 Pohjois-Karjalan ja Uudenmaan-Hämeen piirimetsälautakunnan alueelta. Mukana on yhteensä 338 sellaista maatilametsän- ja metsätilanomistajaa, jotka ovat äskettäin osallistuneet metsätalouden suunnitteluun. Metsänomistajien arvoluttuvuuksien määrittelyssä ja yksityistalouksien tyytittelyssä käytetään faktorialanalyysia.

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APPENDICES

APPENDIX 1. The questionnaire — LIITE 1. Kyselylomake

Työtehoseuran metsäsasto
Metsänomistajien päätöksenteko
Postihaastattelu — 68

*Forest Department of Work Efficiency Association
Decision making of forest owners
Postal interview — 68*

Omistajan nimi
Name of owner

Tilan nimi ja postiosoite
Name and address of farm

A 1. Kuinka suuri on tilanne nykyinen kokonaisala? ha
What is the present total area of your farm? hectares

201. peltoala
field area

202. metsäala
forested area

204.1) A 2. Kuinka monessa erillisessä palstassa metsänne ovat? palstaa
How many separate plots does your forest contain? plots

A 3. Mitkä ovat palstojen pinta-alat ja etäisyydet vakinaisesta asunnostanne?
What are the areas of the plots, and how far are they from your permanent residence?

pinta-ala <i>area</i>	etäisyys <i>distance</i>	pinta-ala <i>area</i>	etäisyys <i>distance</i>
..... ha km ha km
..... hectares kilometres hectares kilometres
..... » » » »
..... » » » »

228. A 4. Omistajan ikä vuotta
Age of owner years

229. A 5. Kuinka monta vuotta olette itse hallinnut nykyistä tilaanne? vuotta
How many years have you yourself possessed your present farm? years

230. A 6. Kuinka monta vuotta tila on ollut Teidän tai puolisonne suvun hallussa? vuotta
How many years has the farm belonged to you or to your wife's family? years

A 7. Oletteko (rasti ruutuun)
Are you (tick)

231. { naimisissa
 married
 naimaton
 unmarried
 eronnut tai leski
 divorced or widow(er)

A 8. Miten olette saanut tilan hallintaanne?
(Jos useammalla tavalla, merkitään useampia rasteja)
*How did the farm come into your possession?
(If in many ways, tick all of them)*

232. — perinyt vanhemmilta tai sukulaisilta
inherited from parents or relatives
233. — ostanut vanhemmilta tai sukulaisilta
bought from parents or relatives
234. — ostanut vapailta markkinoilta
bought on the open market
235. — asutuslakien mukainen kauppa
bought in pursuance of the settlement laws

¹⁾ number of variable

236. A 9. Luuletteko tilanne jäävän perheenne hallintaan elinajaksenne?
Do you think that your farm will remain in the possession of your family for as long as you live?
- Kyllä
Yes
(3)
- Ei osaa sanoa
Can not say
(2)
- Ei
No
(1)
-
237. A 10. Suunnitteletteko tilanne jättämistä jonkun perheenjäsenen hallintaan?
Are you planning to leave your farm to some member of your family?
-
238. A 11. Arveletteko, että perijät tulevat pitämään tilan jatkuvasti hallussaan?
Do you think that your heirs will continue to keep the farm?
-
239. A 12. Kuinka monta henkeä kuuluu tällä hetkellä Teidän talouteenne? henkeä
(ruokakuntaanne) persons
At the moment, how many persons belong to your household?
240. A 13. Kuinka moni ruokakuntanne 15 vuotta täyttäneistä tekee pääasiassa oman maatilanne töitä? henkeä
How many persons aged over 15 of your household work mainly at your own farm? persons
242. A 14. Kuinka moni ruokakuntanne 15 vuotta täyttäneistä tekee pääasiassa ansiotöitä tilan ulkopuolella (tai ammatiltaan muu kuin maanviljelijä-metsäntuottaja)? henkeä
How many persons aged over 15 of your household work for their living mainly outside the farm (or have some other occupation than that of a farmer-forest owner)? persons
- A 15. Mitä kouluja olette käynyt?
(Tarvittaessa useampia rasteja)
Which schools have you attended?
(Many ticks if needed)
243. { Vähemmän kuin kansakoulun
Less than elementary school
Kansakoulun
Elementary School
Osan keskikoulua
A part of an intermediate school
Keskikoulun
Intermediate school
244. { Alemman maatalousoppilaitoksen
Lower school of agriculture
Ylemmän maatalousoppilaitoksen
Higher school of agriculture
Alemman metsäoppilaitoksen
Lower school of forestry
Ylemmän metsäoppilaitoksen
Higher school of forestry
245. { Muun, minkä
Some other school, which
.....
- A 16. Mikä on nykyinen ammattinne?
Your present profession?
- A 17. Mitä seuraavista varusteista asunnossanne on?
(Yksi tai useampi rasti)
Which equipment do you have in your home?
(One or more ticks)
246. { Sähkö
Electricity
Vesijohto
Running water
Viemäri
Discharge pipes
WC
Pesukone
Washing machine
Ei mitään
Nothing

A 18. Entä onko Teillä (Yksi tai useampi rasti) <i>And do you have (One or more ticks)</i>		247. {	Radio <input type="checkbox"/>
			Wireless <input type="checkbox"/>
			Puhelin <input type="checkbox"/>
			Telephone <input type="checkbox"/>
			Televio <input type="checkbox"/>
			Television <input type="checkbox"/>
		Auto <input type="checkbox"/>	
		Car <input type="checkbox"/>	
		Ei mitään <input type="checkbox"/>	
		Nothing <input type="checkbox"/>	
A 19. Kuinka pitkä matka on asunnostanne <i>How far is your home from the</i>			
249. — lähimpään naapuriin	m		
<i>nearest neighbour</i>	<i>metres</i>		
250. — linja-autotien varteen	m		
<i>nearest bus stop</i>	<i>metres</i>		
251. — lähimpään kirkonkylään	km		
<i>nearest village</i>	<i>kilometres</i>		
252. — lähimpään kaupunkiin	km		
<i>nearest town</i>	<i>kilometres</i>		
B 1. Mihin tärkeysjärjestykseen asettaisitte seuraavat metsätaloutenne tavoitteet? (Kolme rastia; ohje seuraavalla sivulla) <i>Into which order of relative importance would you put the following objectives of your forestry? (Three ticks, see direction)</i>			
	Tärkein <i>Most important¹⁾</i>	Toiseksi tärkein <i>Next important</i>	Vähiten tärkeä <i>Least important</i>
6. — saada tuloja lainojen lyhennysten ja korkojen maksamiseen <i>to get income for part payments and interest on debts</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. — saada tuloja verojen maksamiseen <i>to get income for the payment of taxes</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. — saada tuloja perheen elatukseen <i>to get income for sustenance of the family</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. — saada työtilaisuuksia omalle työvoimalle tai koneille <i>to get working opportunities for own labour and machines</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. — saada tuloja asuin- tai tuotantorakennusten rakentamiseen <i>to get income for building of dwelling or production houses</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. — saada tuloja maatalouskoneiden tai kotieläinten ostoon <i>to get income for buying farm machines or domestic animals</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. — saada tuloja maanostoon tai sisarusuuk-sien lunastamiseen <i>to get income for buying land or for buying out other heirs</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. — saada tuloja salaojitukseen, sähköistämiseen, vesijohtojen hankkimiseen tai muihin perusparannuksiin <i>to get income for drainage, electrification, installation of water, or for other basic improvements</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. — saada tuloja lasten koulutukseen <i>to get income for education of the children</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

¹⁾ Scoring of answers to questions with fixed alternatives of type most-next-least:

most = number of alternatives (n)

next = number of alternatives less one (n-1)

least = 1

other alternatives = average of 2 and n-2

OHJE:**DIRECTION:**

Useimmat seuraavistakin kysymyksistä ovat muodoltaan samanlaisia kuin edellä. Niissä esitetään useampia vaihtoehtoja, joista Teidän olisi valittava tärkein, toiseksi tärkein ja vähiten tärkeä. Jos pidätte tulojen saamista sisärosuuskien lunastamista varten metsätaloutenne tärkeimpänä tavoitteena, työtilaisuuksien saamista omalle työvoimalle ja koneille toiseksi tärkeimpänä ja tulojen saamista verojen maksamista varten vähiten tärkeänä tavoitteena esitetystä vaihtoehdoista, merkitään kolme rastia seuraavasti:

Most of the following questions also have the same form as those above. Many possibilities are given, and you should choose the most important, the next important, and the least important of them. If you think that of the possibilities given the most important objectives for your forestry are to get income for buying out the other heirs, next important to get working opportunities for four own labour and machines, and the least important to get income for the payment of taxes, the three ticks are entered as follows:

	Tärkein Most important	Toiseksi tärkein Next important	Vähiten tärkeä Least important
— saada tuloja lainojen lyhennysten ja korkojen maksamiseen <i>to get income for part payments and interest on debts</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
— saada tuloja verojen maksamiseen <i>to get income for the payment of taxes</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
— saada työtilaisuuksia omalle työvoimalle tai koneille <i>to get working opportunities for own labour and machines</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
— saada tuloja asuin- tai tuotantorakennusten rakentamiseen <i>to get income for building of dwelling or production houses</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
— saada tuloja maatalouskoneiden tai kotieläinten ostoon <i>to get income for buying farm machines or domestic animals</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
— saada tuloja maanostoon tai sisärosuuskien lunastamiseen <i>to get income for buying land or for buying out other heirs</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
— saada tuloja salaojitukseen, sähköistämiseen, vesijohtojen hankkimiseen tai muihin perusparannuksiin <i>to get income for drainage, electrification, installation of water, or for other basic improvements</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
— saada tuloja lasten koulutukseen <i>to get income for education of the children</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Vastatkaa avoimesti jokaiseen kysymykseen ja merkitkää se tärkeysjärjestys, joka tulee ensiksi mieleenne tuhlaamatta aikaa turhaan pohdiskeluun.

Answer every question frankly, and tick the order of relative importance which first comes into your mind, without wasting time on fruitless thought.

- B 2. Mihin tärkeysjärjestykseen asettaisitte seuraavat näkökohdat omistaessanne tai lisämetsäpalstan hankkiessanne?
(Kolme rastia)

Into which order of relative importance would you put the following viewpoints when possessing forest or acquiring an additional wooded area (Three ticks)

15. — metsä kohottaa tilan arvoa
forest enhances the value of forest
16. — metsä tarjoaa säännöllisesti toistuvia kantoraha- ja työtuloja
forest gives regular income from sales on the stump, and regular earnings
17. — metsä auttaa selviytymään poikkeuksellista rahantarpeista
forest helps you out of an exceptional need of money

Tärkein
*Most
important*

Toiseksi
tärkein
*Next
important*

Vähiten
tärkeä
*Least
important*

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- B 3. Metsä kohottaa tilanne arvoa monella tavalla. Mitä seuraavista tavoista pidätte tärkeimpänä, toiseksi tärkeimpänä ja vähiten tärkeänä? (Kolme rastia)

Forest enhances the value of your farm in many ways. Which of the following ways do you consider most important, next important and least important? (Three ticks)

18. — metsä kohottaa tilan arvoa, koska se tarjoaa rakennus- ja muuta kotitarvepuuta
forest enhances the value of the farm because it gives building timber and other wood for home use
19. — metsä kohottaa tilan arvoa, koska se lisää asuinpaikan viihtyisyyttä ja tarjoaa monenlaisia virkistysmahdollisuuksia
forest enhances the value of the farm because it raises the comfort of the home and offers many opportunities for recreation
20. — metsä kohottaa tilan arvoa, koska se tarjoaa kantorahatuloja
forest enhances the value of the farm because it gives income from sales on the stump
21. — metsä kohottaa tilan arvoa, koska se tarjoaa työtuloja
forest enhances the value of the farm because it gives earnings
22. — metsä kohottaa tilan arvoa, koska se parantaa luotonsaantimahdollisuuksia
forest enhances the value of the farm because it improves chances of getting credit
23. — metsä kohottaa tilan arvoa, koska maan arvo jatkuvasti nousee esimerkiksi tonttimaana
forest enhances the value of the farm because the soil value rises continually, for instance as a building site

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- B 4. Mihin tärkeysjärjestykseen asettaisitte seuraavat tavoitteet suorittaessanne metsänhoidollisia toimenpiteitä (uudistusalan raivausta, kylvöä, istutusta, taimikohitoa jne)? (Kolme rastia)
Into which order of importance would you put the following objectives when you are taking silvicultural measures (preparation of regeneration area, sowing, planting, tending of new growth etc)?
(Three ticks)
- | | | | |
|---|--------------------------|--------------------------|--------------------------|
| 24. — pyrin täyttämään lain säädökset
<i>I endeavour to fulfil the provisions of law</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 25. — pyrin hoitamaan hyvin ja kartuttamaan omaisuuttani
<i>I endeavour to tend well and to augment my property</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 26. — pyrin turvaamaan säännölliset, jatkuvat hakkuumahdollisuudet
<i>I endeavour to ensure regular, continual cutting possibilities</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 27. — pyrin turvaamaan hakkuumahdollisuuksia pahan päivän varalle
<i>I endeavour to ensure cutting possibilities for rainy days</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 28. — pyrin täyttämään velvollisuuteni yhteiskuntaa kohtaan
<i>I endeavour to fulfil my duty to society</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
- B 5. Mitkä seuraavista seikoista antavat myönteisimmän, toiseksi myönteisimmän ja vähiten myönteisen kuvan metsänomistajasta? (Kolme rastia)
Which of the following things give the most positive, next positive, and least positive picture of a forest owner? (Three ticks)
- | | Myönteisin
<i>Most positive</i> | Toiseksi myönteisin
<i>Next positive</i> | Vähiten myönteinen
<i>Least positive</i> |
|---|------------------------------------|---|---|
| 29. — metsien lannoitus
<i>fertilization of forests</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 30. — kasvuisat nuoret metsät
<i>vigorous young stands</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 31. — metsien perkaukset ja puhdistusharvennukset
<i>cleaning of stands</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 32. — järeät puustot
<i>stands of large-sized trees</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 33. — laajat metsänviljelyalueet (kylvö- ja istutusalueet)
<i>extensive regeneration areas (areas sowed and planted)</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
- B 6. Miten tärkeänä pidätte sijoituksenne tuottamaa korkoprosenttia harkitessanne metsäpalstan ostoa ja miten tärkeänä pidätte sitä harkitessanne metsän viljelyä?
How important do you consider the per cent return on your investment when you think of buying a wooded area, and how important do you consider it when you think to start artificial regeneration?
- | | Metsäpalstan ostossa (alle yksi rasti)
<i>In buying a wooded area (one tick)</i> | Metsän kylvössä tai istutuksessa (alle yksi rasti)
<i>In forest sowing or planting (one tick)</i> |
|---|---|--|
| — korkoprosentti ratkaisee asian
<i>per cent return on capital settles the question</i> | <input type="checkbox"/> | <input type="checkbox"/> |
| — korkoprosentti on tärkeä, mutta ei ratkaise asiaa
<i>per cent return is important but not decisive</i> | <input type="checkbox"/> | <input type="checkbox"/> |

- korkoprosentti on vähemmän tärkeä, mutta sekin on otettava päätöksessä huomioon
per cent return is less important but must also be taken into consideration in decision
- korkoprosentti ei vaikuta päätökseen
per cent return does not affect the decision

B 7. Mitä seuraavista keinoista pitäisitte parhaana, toiseksi parhaana ja mitä huonoimpana pyrkiessänne mahdollisimman edulliseen tulokseen metsiennne hoidossa ja käytössä? (Kolme rastia)

Which of the following ways do you consider best, next best and worst when you aim at the best possible result in treatment and utilization of your forests? (Three ticks)

36. -- pyrkiä myymään silloin, kun puutavaran hinta on edullisin
try to sell when the price of timber is most favourable
37. -- pyrkiä ostamaan ja myymään edullisesti metsäpalstoja
try to buy and sell wooded areas profitably
38. -- pyrkiä järjestämään työtilaisuuksia omalle työvoimalle ja koneille
try to arrange working opportunities for own labour and machines
39. -- pyrkiä käyttämään tehokkaita urakoitsijoita metsien hoidossa ja puunkorjuussa
try to employ effective contractors for silviculture and logging
40. -- pyrkiä tuottamaan mahdollisimman paljon puuta hehtaaria kohti
try to produce as much timber per hectare as possible

B 8. Mitä seuraavista keinoista pienmetsätalouden edistämiseksi pitäisitte parhaana, mitä toiseksi parhaana ja mitä huonoimpana? (Kolme rastia)

Which of the following ways to promote private forestry do you consider best, next best and worst? (Three ticks)

41. -- suurentaa tilakokoa
to enlarge the farm size
42. -- käyttää entistä enemmän urakoitsijoita
to employ more contractors than before
43. -- siirtää entistä enemmän tehtäviä valtion varoin hoidettavaksi
to leave more tasks than before to be done at the expense of the State
44. -- siirtää entistä enemmän tehtäviä puutavarayhtiöiden suoritettavaksi
to leave more tasks than before to be done at the expense of timber companies
45. -- lisätä metsien yhteisomistusta (yhteismetsä, metsäosakeyhtiö, metsäyhtymä jne)
to increase the joint ownership of forests (forest common, forest company, cooperative forest)
46. -- lisätä metsänomistajien keskinäistä yhteistoimintaa nykyisin rajoin
to increase the mutual cooperation of forest owners without changing present boundaries

Paras keino <i>Best way</i>	Toiseksi paras keino <i>Next best way</i>	Huonoin keino <i>Worst way</i>
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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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47. — lisätä metsänomistajien koulutus- ja valistustyötä
to intensify the training and educating of forest owners

- B 9. Mikä seuraavista tekijöistä mielestänne eniten vaikeuttaa metsänomistajien keskinäistä yhteistoimintaa, mikä toiseksi eniten ja mikä vähiten? (Kolme rastia)
Which of the following factors hampers the mutual cooperation of forest owners most, next most and least? (Three ticks)

Yhteistoimin- taa eniten vaikeuttava tekijä <i>Factor most influencing the cooperation</i>	Yhteistoimin- taa toiseksi eniten vai- keuttava te- kijä <i>Factor next most in- fluencing the cooperation</i>	Yhteistoimin- taa vähiten vaikeuttava tekijä <i>Factor least influencing the cooperation</i>
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48. — sopivien johtajien puute
lack of qualified leaders
49. — yhteistoimintaa on vaikea saada taloudellisesti kannattavaksi
it is difficult to get cooperation economically profitable
50. — yhteistoiminta vähentää yksityisen metsänomistajan työtilaisuuksia
cooperation diminishes the working opportunities of a single forest owner
51. — erimielisyydet metsänomistajien kesken tai pelko niiden syntymisestä
discord between forest owners or fear of its arising
52. — toiset metsänomistajat hyötyvät yhteistoiminnasta enemmän kuin toiset
some forest owners profit more than others from cooperation
53. — yhteistoiminnasta tulevaa hyötyä on vaikea jakaa puutavaran myyjien ja ostajien kesken
it is difficult to divide the gain from the cooperation between sellers and buyers of timber
54. — metsätalouden muiden etupiirien (esimerkiksi puutavarayhtiöt, metsätyömiehet, metsäammattimiehet) vastustus
the opposition of other circles of interest in forestry (e.g. timber companies, forest workers, professional foresters etc.)
55. — päätäntävältä yhteistoiminnassa saattaa siirtyä metsänomistajakunnan ulkopuolelle
it is possible that the forest owners lose their power of decision

- B 10. Minkä seuraavista ratkaisuista voisitte tarvittaessa helpoimmin jättää yhteistoiminta-organisaation päätettäväksi, minkä toiseksi helpoimmin ja minkä kaikista viimeiseksi? (Kolme rastia)
Which of the following decisions could you, if needed, leave to the organization of cooperation most easily, next easily, and which of them last? (Three ticks)

Ratkaisu, jonka päätäntävällän voisin helpoimmin luovuttaa <i>Decision which I could leave away most easily</i>	Ratkaisu, jonka päätäntävällän voisin toiseksi helpoimmin luovuttaa <i>Decision which I could leave next easily</i>	Ratkaisu, jonka päätäntävällän olisin vähiten halukas luovuttamaan <i>Decision which I could leave away least</i>
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56. — metsän käsittelytavan (uudistus, kasvatus, harvennustapa) valitseminen
choice of treatment method of the forest (regeneration, raising of stand, thinning method)

- | | | | |
|---|---|---|--|
| 57. — puutavaran myynnin ja hakkuun ajan-
kohdan valitseminen
<i>choice of the time for selling and cutting</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 58. — ostajan valitseminen
<i>choosing buyer</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 59. — pysty-, hankinta- tai käteiskaupan va-
litseminen
<i>choice between sale on the stump, delivery
sale or cash sale</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 60. — korjuumenetelmän valitseminen
<i>choice of logging method</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 61. — hinnan sopiminen
<i>making agreement on prices</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|
 | | | |
| B 11. Millä seuraavista metsätalouden aloista met-
sänomistajien osuustoiminta tai muu yhteis-
toiminta on tarpeellisinta, toiseksi tarpeel-
lisinta ja millä vähiten tarpeellista? (Kolme
rastia)
<i>In which of the following fields of forestry is
the cooperation of forest owners most necessary,
next necessary and least necessary?
(Three ticks)</i> | Yhteistoiminta
tarpeellisin
<i>Cooperation
most
necessary</i> | Yhteistoiminta
toiseksi tar-
peellisin
<i>Cooperation
next
necessary</i> | Yhteistoiminta
vähiten tar-
peellinen
<i>Cooperation
least
necessary</i> |
| 62. — metsän kasvatuksessa (metsän viljely,
hoito, lannoitus, leimaus jne)
<i>in raising stands (reforestation, tending
of stands, fertilization, marking of stems
for cutting etc.)</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 63. — puutavaran myynnissa
<i>in selling timber</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 64. — puunkorjuussa
<i>in logging</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 65. — ojituksessa ja metsäautoteiden rakenta-
misessa
<i>in drainage, and building of forest roads</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|
 | | | |
| B 12. Mihin tärkeysjärjestykseen asettaisitte seu-
raavat tavoitteet metsänomistajien keski-
näisessä yhteistoiminnassa? (Kolme rastia)
<i>Into which order of importance would you put
the following objectives in the mutual co-
operation of forest owners?
(Three ticks)</i> | Tärkein
tavoite
<i>Most
important
objective</i> | Toiseksi
tärkein
<i>Next
important
objective</i> | Vähiten
tärkeä
tavoite
<i>Least
important
objective</i> |
| 66. — vakinaisen työvoiman palkkaaminen
<i>hiring of permanent labour</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 67. — koneiden hankkiminen
<i>acquiring of machines</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 68. — ammattimiesten palkkaaminen
<i>engagement of forest experts</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 69. — ennakkorahoituksen järjestäminen
<i>arrangement of advance financing</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|
 | | | |
| B 13. Olisiko yhteistoimintaorganisaation asioista
päättävässä kullekin jäsenelle annettava yk-
si ääni vai olisiko äänimäärän oltava suhtees-
sa metsäpinta-alaan tai osuuksien lukumää-
rään? (Yksi rasti)
<i>Should every member of an organization of
cooperation give one vote in the decisions of
the organization, or should the number of
votes be in relation to the forest area or to the
number of shares? (One tick)</i> | Yksi ääni
jokaiselle
<i>One vote for
everybody</i> | Yksi ääni
metsähehta-
ria kohti
<i>One vote per
hectare of
forest</i> | Osuuksien
tai osakkeiden
lukumäärän
mukainen
äänimäärä
<i>Number of votes
in relation to
the number of
shares</i> |
| | 70. | 71. | 72. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

- B 14. Olisiko yhteistoimintaorganisaation päättävällän ja taloudellisen vastuun oltava ensisijaisesti kylä-, kunta-, maakunta vai valtakunnallisessa portaassa? (Yksi rasti)
Should the power of decision and the economic responsibility of the cooperation organization belong, in the first place, to a village organ, a communal organ, a provincial organ or a national organ? (One tick)

Kyläpor- taassa <i>To a village organ</i>	Kunta- portaassa <i>To a communal organ</i>	Maa- kunta- portaassa <i>To a provincial organ</i>	Valta- kunta- portaassa <i>To a national organ</i>
73.	74.	76.	76.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- C 1. Mistä tulolähteestä saatte suurimmat, toiseksi suurimmat ja mistä pienimmät rahatulonne? (Kolme rastia)
From which source of income do you get your largest, next largest and smallest money income? (Three ticks)

Suurin tulolähde <i>Largest source of income</i>	Toiseksi suurin tulolähde <i>Next largest source of income</i>	Pienin tulolähde <i>Smallest source of income</i>
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24. — peltoviljely
raising crops
25. — kotieläintalous
care of domestic animals
26. — omien metsien hakkuut
cutting of own forests
27. — sivuansiot tai maatilatalouden ulkopuolinen ammatti
income from extra work or an occupation outside farming

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- C 2. Katsotteko taloudellisessa asemassanne edulliseksi säilyttää oman ja lainapääoman suhde nykyisellään, lisätä vai vähentää velkaa? (Yksi rasti)
Do you think that, in your economic position, you should keep the ratio of own and loan capital unchanged or increase or diminish the debt? (one tick).

Lisätä velkaa <i>Increase the debt (1)</i>	Säilyttää oman pääoman osuus ennallaan <i>Keep the present ratio unchanged (2)</i>	Vähentää velkaa <i>Diminish the debt (3)</i>
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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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- C 3. Katsotteko menojenne lähivuosina lisääntyvän, vähenevän vai säilyvän suunnilleen ennallaan? (Yksi rasti)
Do you think that, during the coming 5 years, your expenses will increase, diminish or remain unchanged? (One tick)

Menot lisääntyvät <i>Expenses will increase (1)</i>	Menot säilyvät ennallaan <i>Expenses will remain unchanged (2)</i>	Menot vähenevät <i>Expenses will diminish (3)</i>
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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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- C 4. Kuinka monta % oli keskimäärin hakkintahakkuiden osuus tilanne hakkuumääristä viime 5-vuotiskaudella?
How many per cent, on the average, has the proportion of delivery cuts of the total cutting quantity of your farm, been during the last 5 years?

.....%

- C 5. Tuleeko arvionne mukaan hakkintahakkuiden osuus ensi 5-vuotiskaudella tilallanne lisääntymään, vähenevään vai säilyvään ennallaan? (Yksi rasti)
According to your estimation, will the proportion of delivery cuts on your farm increase, diminish or remain unchanged during the next 5 years? (One tick)

Hakkintahakkuiden osuus lisääntyy tilalla <i>Delivery cutting on the farm will increase (1)</i>	Säilyvät ennallaan <i>They will remain unchanged (2)</i>	Hakkintahakkuiden osuus vähenevään <i>Delivery cuts will diminish (3)</i>
--	--	---

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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- C 6. Kuinka monta % oli keskimäärin oman väen osuus työpäivistä tilanne maataloustöissä viime 5-vuotiskaudella?

How many per cent of the working days in the agricultural work on your farm, on the average, has been done by the farm's own labour, during the last 5 years?

.....%

- C 7. Tuleeko oman väen osuus tilanne maataloustöissä ensi 5-vuotiskaudella arvionne mukaan lisääntymään, vähenemään vai säilymään ennallaan? (Yksi rasti)
- According to your estimation, will the proportion of the farm's own labour in the agricultural work of your farm increase, diminish or remain unchanged, during the next 5 years? (One tick)*

Oman väen osuus tilanne maataloustöissä lisääntyy
Proportion of farm's own labour in the agricultural work of the farm will increase
(1)

Säilyy ennallaan
It will remain unchanged
(2)

Oman väen osuus vähenee
Proportion of farm's own labour will diminish
(3)

- C 8. Kuinka monta % oli keskimäärin tilan ulkopuolisten ansiotöiden (sivuansiot tai maatilatalouden ulkopuolinen ammatti) osuus oman väen työpäivistä parina viime vuotena?

How many per cent, on the average, has the proportion of work been outside the farm (extra earnings or occupation outside farming) of the working days of the farm's own labour, during recent years?

.....%

- C 9. Tuleeko tilan ulkopuolisten ansiotöiden (sivuansiot tai maatilatalouden ulkopuolinen ammatti) osuus oman väen työpäivistä lähivuosina lisääntymään, vähenemään vai säilymään ennallaan? (Yksi rasti)
- Will the proportion of work outside the farm (extra earnings or an occupation outside farming) of the working days of the farm's own labour increase, diminish or remain unchanged, during the coming years (One tick)*

Tilan ulkopuolisten töiden osuus lisääntyy
Proportion of work outside the farm will increase
(1)

Tilan ulkopuolisten töiden osuus säilyy ennallaan
Proportion of work outside the farm will remain unchanged
(2)

Tilan ulkopuolisten töiden osuus vähenee
Proportion of work outside the farm will diminish
(3)

- C 10. Pidätkö asemassanne edullisena pyrkiä 85. tasaisiin vuotuisiin hakkuumääriin, hakata lähivuosina poikkeuksellisen paljon vai säästää hakkuumahdollisuuksia myöhempää tarvetta varten? (Yksi rasti)
- Do you think that, in your position, it is profitable to strive for equal cutting quantities, to cut exceptionally much in the intermediate future, or reserve cutting possibilities for future needs? (One tick)*

Edullisinta hakata lähivuosina mahdollisimman paljon
It is most profitable to cut as much as possible in the intermediate future
(1)

Edullisinta pyrkiä tasaisiin hakkuumääriin
It is most profitable to strive for equal cutting quantities
(2)

Edullisinta säästää hakkuumahdollisuuksia myöhempää tarvetta varten
It is most profitable to save cutting possibilities for future needs
(3)

- C 11. Mitä seuraavista pidätte itsellenne edullisimpana, toiseksi edullisimpana ja mitä vähiten edullisena säästämistapana? (Kolme rastia)

Which of the following ways of saving do you regard as most favourable, next favourable and least favourable for yourself? (Three ticks)

86. — säästää pankkiin
to save in the bank
87. — säästää asunto-osakkeisiin
to save in shares in a housing association
88. — säästää henkivakuutuksiin
to save in life insurance
89. — säästää muihin arvopapereihin
to save in other bonds and securities
90. — säästää kasvavaan puustoon
to save in growing stock

Edullisin säästämistapa <i>The most favourable way to save</i>	Toiseksi edullisin säästämistapa <i>The next best way to save</i>	Vähiten edullinen säästämistapa <i>The least favourable way to save</i>
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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- C 12. Mikä teidän kohdallanne on metsätaloudellisten sijoitusten tärkein, toiseksi tärkein ja mikä vähiten tärkeä kilpailija? (Kolme rastia)
As regards yourself, what is the most important, next important and least important rival for forest investments? (Three ticks)

91. — sijoitukset maatalouteen
agricultural investments
92. — tilan ulkopuoliset sijoitukset
investments outside the farm
93. — perheen asunto-, ruoka-, vaate- ym. välttämättömät menot
housing, food, clothes, and other necessary expenses of the family
94. — auto, TV, matkailu yms. menot
car, TV, travelling, and other such expenses
95. — säästäminen
saving

Tärkein kilpailija <i>Most important rival</i>	Toiseksi tärkein kilpailija <i>Next important rival</i>	Vähiten tärkeä kilpailija <i>Least important rival</i>
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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- C 13. Arvioitko omistuksessanne olevan metsäpinta-alan lisääntyvän, vähenevän vai säilyvän ennallaan lähimmän 5 vuoden aikana? (Yksi rasti)

Do you think that the forest area in your possession will increase, diminish or remain unchanged, during the next 5 years? (One tick)

Metsäpinta-ala lisääntyy <i>Forest area increases</i> (1)	Metsäpinta-ala säilyy ennallaan <i>Forest area remains unchanged</i> (2)	Metsäpinta-ala vähenee <i>Forest area diminishes</i> (3)
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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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- C 14. Mitkä seuraavista metsäpinta-alueen muutoksista ovat todennäköisiä lähimmän 5 vuoden aikana? (yksi tai useampi rasti)
Which of the following changes in your forest area are probable during the coming 5 years? (One or more ticks)

- perinnön saanti
inheritance
97. — perinnön jako
division of an inheritance
98. — metsää raivataan pelloksi tai viljelylaitumeksi
forest is cleared into field or pasture
- metsää raivataan tie- tai tonttimaiksi
forest is cleared into roads or building sites
99. — metsitetään peltoa
afforestation of fields

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

100. — ostetaan lisää metsäalaa
buying of forest land
 — myydään metsäalaa
selling of forest land
 — muutokset epätodennäköisiä
changes unlikely

- C 15. Tuleeko metsänhoidon kannattavuus mie-
 101. lestänne paranemaan, huononemaan vai säi-
 lymään ennallaan tulevaisuudessa? (Yksi
 rasti)
*Do you think that the profitability of silvi-
 culture will be better, will be worse or will
 remain unchanged, in the future? (One tick)*

Kannattavuus
 paranee
*Profitability
 will be better*
 (1)

Kannattavuus
 säilyy ennallaan
*Profitability
 will remain
 unchanged*
 (2)

Kannattavuus
 huononee
*Profitability
 will be worse*
 (3)

- C 16. Tuleeko metsänhoidon kannattavuus ver-
 102. rattuna maatalouden kannattavuuteen mie-
 lestänne paranemaan, huononemaan vai säi-
 lymään ennallaan tulevaisuudessa? (Yksi
 rasti)
*Do you think that the profitability of forestry
 will be better, or will it be worse or remain
 unchanged in comparison with the profitability
 of agriculture, in the future? (One tick)*

Metsänhoidon
 kannattavuus
 paranee
 maatalouteen
 verrattuna
*In comparison
 with agri-
 culture, the
 profitability
 of silviculture
 will be better*
 (1)

Kannattavuus-
 suhteet säily-
 vät ennallaan
*Profitability
 relations will
 remain un-
 changed*
 (2)

Metsänhoidon
 kannattavuus
 huononee
 maatalouteen
 verrattuna
*In comparison
 with agri-
 culture, the
 profitability of
 silviculture will
 be worse*
 (3)

- C 17. Kumman kasvatusta on Teille mielestänne
 vastaisuudessa edullisempaa järeän puun vai
 pinotavaran, vai onko niiden kasvatusta
 suunnilleen yhtä edullista? (Yksi rasti)
*In the future, will it be more profitable to raise
 large-sized timber or pulpwood, or is there no
 difference in profitability? (One tick)*

Järeän puun
 kasvatusta
 edullisempaa
*More
 profitable
 to raise large-
 sized timber*
 (1)

Järeän puun
 ja pinotavaran
 kasvatusta yhtä
 edullista
*As profitable
 to raise large-
 sized timber
 as pulpwood*
 (2)

Pinotavaran
 kasvatusta
 edullisempaa
*More profitable
 to raise
 pulpwood*
 (3)

Esittäkää oma mielipiteenne seuraavista metsätaloutta koskevista väitteistä — valitkaa jokin näistä vaihtoehdoista. Sanokaa sen mukaan miltä Teistä tuntuu. (Yksi rasti kunkin väitteen kohdalle.)

Give your own opinion on the following statements concerning forestry — choose one of these alternatives. Indicate the way your feel.

	Aivan samaa mieltä <i>I fully agree</i> (5)	Jokseenkin samaa mieltä <i>I am of almost the same opinion</i> (4)	Vaikeaa sanoa <i>Difficult to say</i> (3)	Jokseenkin eri mieltä <i>I don't quite agree</i> (2)	Aivan eri mieltä <i>I totally disagree</i> (1)
C 18. 104. »Metsänhoito ja käyttö olisi jätettävä yksin omaan omistajan harkintaan» <i>»Treatment and utilization of the forest should be left to the forest owner alone»</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C 19. 105. »On paikallaan, että valtio rajoittaa enemmän metsänomistusta ja käyttöä kuin viljelysmaan omistusta ja käyttöä» <i>»It is quite all right that the State restricts the possession and utilization of forest more than the possession and utilization of agricultural lands»</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C 20. 106. »On ensi sijassa valtion asia pitää huolta, että metsämaat ovat tuottokunnossa» <i>»In the first place, it is up to the State to ensure that the forest land is kept in productive condition»</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C 21. 107. »Avustusten vastaanottaminen valtiolta rajoittaa metsänomistajan omistusoikeutta ja itsenäisyyttä» <i>»Receiving subventions from the State restricts the proprietary rights and independence of a forest owner»</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C 22. 108. »Metsäpalstojen ja -tilojen kauppvoja pitäisi valtion toimenpitein helpottaa ja lisätä» <i>»Sales of wooded areas and forest farms should be made easier and increased by the measures of the State»</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C 23. 109. »Muun kuin maanviljelijäväestön metsämaiden osto-oikeutta pitäisi rajoittaa enemmän» <i>»The rights of persons other than farmers to buy forest should be more restricted»</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C 24. 110. »Metsätaloudessa kannattaa usein tinkiä puuntuotannon vaatimuksista maiseman, riistanhoidon, matkailun ja metsien virkistyskäytön hyväksi» <i>In forestry, it is often useful to depart from the requirements of wood production in favour of landscape, game protection, travelling, and recreational use of forest»</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C 25. 111. »Metsien hoito kannattaa paremmin kuin maanviljely» <i>»Silviculture is more profitable than agriculture»</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C 26. 112. »Metsänviljely on taloudellisesti erittäin edullista» <i>»Artificial regeneration is economically very profitable»</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- C 27. »Metsänomistajien keskinäinen yhteistoimin-
113. ta ei ole kannatettavaa, koska se rajoittaa
liiaksi yksityisen omistusoikeutta ja päätän-
tävaltaa»
»The mutual cooperation of forest owners is not
worth supporting because it too much restricts
the proprietary rights and power of decision
of an individual»

Lopuksi eräitä yleisluonteisia väitteitä. Esittäkää niihin oma mielipiteenne — valitkaa jokin vaihtoehdoista sen mukaan miltä Teistä tuntuu. (Yksi rasti kunkin väitteen kohdalle)
In conclusion, some general statements. Give your own opinion on them — choose one of the alternatives according to what you feel. (One tick for every statement)

- | | Aivan samaa mieltä
I fully agree
(5) | Jokseen-kin samaa mieltä
I am of almost the same opinion
(4) | Vaikea sanoa
Difficult to say
(3) | Jokseen-kin eri mieltä
I don't quite agree
(2) | Aivan eri mieltä
I totally disagree
(1) |
|--|--|--|---|--|---|
| D 1. »Kannattaa mieluummin elää omilla varoilla
253. vaikkapa köyhänä kuin ottaa velkaa»
»It is better to live poor on one's own than contract debts» | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| D 2. »On kiusallista, jos tuttavien periaatteet
254. eroavat omista periaatteista»
»It is annoying if the principles of a friend differ from one's own principles» | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| D 3. »Kaikkein vastenmielisintä poliittista kiiho-
255. tusta lehdissä ei pitäisi sallia»
»The most repellent political agitation in the papers should not be allowed» | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| D 4. »Rahalla on vasta sitten arvoa, kun se on
256. kovalla työllä hankittu»
»Money has value only when it is acquired by hard work» | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| D 5. »Aatteelliset erimielisyydet ovat hyvä asia
257. yhteiskunnassa»
»Differences of principle are a fine thing in a society» | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| D 6. »Kohtalainen mutta varma toimeentulo on
258. arvokkaampi kuin huippupalkkainen asema»
»A moderate but safe living is more valuable than a position with a top salary» | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| D 7. »Elämässä kannattaa usein ottaa riskejäkin»
259. »Many a time in this life, it is worth taking risks» | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| D 8. »On luonnollista, että heikot sortuvat»
260. »It is natural that the weaklings perish» | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| D 9. »Nykyään kannattaa kenen tahansa yrittää
261. elämässä parempiin oloihin»
»Nowadays it is worth trying for everybody to strive for better conditions in life» | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

- | | | | | | | |
|------------|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| D 10. 262. | »On häpeä, jos ei pysty omin voimin tulemaan toimeen»
»It is a shame if you are not able to depend on your own resources» | <input type="checkbox"/> |
| D 11. 263. | »Ikävä kyllä, jokaisen on käytettävä kyy-näpäätaktiikkaa elämässä päästäkseen eteenpäin»
»Too bad, but everyone has to use elbowing if he will succeed in life» | <input type="checkbox"/> |
| D 12. 264. | »Ihmiset, jotka eivät piittaa yleisesti hyväksytyistä tavoista, ovat harmillisia»
»People who do not care about generally accepted manners are annoying» | <input type="checkbox"/> |
| D 13. 265. | »Ihmiset, jotka valitsevat ammattinsa rahaa ajatellen, eivät menettele viisaasti»
»People who choose their profession thinking only of money, do not act wisely» | <input type="checkbox"/> |
| D 14. 266. | »Useimmat ihmiset tyytyvät elämässään liian vähäpätöisiin tuloksiin»
»Most people are contented with too insignificant results in their lives» | <input type="checkbox"/> |
| D 15. 267. | »Suomalaiset kuluttavat liian paljon ja säästävät liian vähän»
»The Finns spend too much and save too little» | <input type="checkbox"/> |
| D 16. 268. | »Ihmisen on parempi uskoa siihen, mitä elämä on hänelle opettanut, eikä esimerkiksi tiedemiesten käsityksiin, jotka jatkuvasti muuttuvat»
»It is better for a man to trust in what life has taught him, and not, for instance, in the views of scientists, which are constantly changing» | <input type="checkbox"/> |
| D 17. 269. | »Elämä kaupungissa on paljon helpompaa ja mukavampaa kuin mitä se on maaseudulla»
»Living in a town is much easier and more comfortable than living in the country» | <input type="checkbox"/> |
| D 18. 270. | »Maanviljely on elinkeino, jonka varassa on koko kansan hyvinvointi»
»Agriculture is an industry upon which the whole prosperity of the nation rests» | <input type="checkbox"/> |
| D 19. 271. | »On hyvä, että yhteiskuntamme muuttuu, koska muutokset ovat enimmäkseen hyvään suuntaan»
»It is good that our society changes because the changes are usually in a good direction» | <input type="checkbox"/> |
| D 20. 272. | »On häpeä, jos maa jätetään tuottamattomaan tilaan»
»It is a shame if the land is left in unproductive condition» | <input type="checkbox"/> |
| D 21. 273. | »Maanomistus on varmin turvallisuuden ja riippumattomuuden taee»
»Landowning is the safest guarantee of security and independence» | <input type="checkbox"/> |

E. Onko tässä haastattelulomakkeessa sivuutettu tai käsitelty liian pintapuolisesti jotakin olennaista metsänomistajien päämääriin ja metsätaloudellisiin ratkaisuihin vaikuttavaa tekijää, johon mielestänne olisi kiinnitettävä huomiota? Jos on, niin mikä:
Have some essential factors, to which one should pay attention, and which influence the aims and decisions concerning forestry of forest owners, been overlooked or treated superficially, in this questionnaire? If so, which:

F. Muita mahdollisia mielipiteitänne tästä tutkimuksesta:
Other possible opinions of yours on this investigation:

App. 2. Records of the forest management plan
 Liite 2. Metsätaloussuunnitelmasta kerätyt tiedot

	Metsänhoitoyhdistys	
	<i>Forest management association</i>	
	Omistajan nimi	
	<i>Name of owner</i>	
	Tilan nimi	
	<i>Name of farm</i>	
	1. Omistajan ammatti	
	<i>Occupation of owner</i>	
223.	2. Omistajan vakinainen asuinkunta	
	<i>Permanent residence of owner</i>	
	3. Kunta, jossa pääosa metsäalasta sijaitsee	
	<i>Commune, in which the forest holding is principally located</i>	
	4. Maatalousmaan ala	ha
	<i>The field area</i>	hectares
	5. Metsämaan ala (kitu- ja joutomaata ei oteta mukaan)	ha
	<i>Forest area</i>	hectares
	6. Maatilan kokonaispinta-ala	ha
	<i>Total area of farm</i>	hectares
207.	7. Kehitysluokan 0 ala (koskee vain metsämaata)	ha
	<i>Development class 0</i>	hectares
	8. » » 1	»
208.	9. » » 2	»
209.	10. » » 3	»
210.	11. » » 4	»
	12. » » 5	»
211.	13. » » 6	»
212.	14. Puuston määrä metsämaalla	k-m ³ /ha
	<i>Mean volume</i>	solid cubic meters/hectare
213.	15. Puuston kasvuprosentti metsämaalla	%
	<i>Increment percentage</i>	per cent
	16. Talouskauden pituus	v
	<i>Length of planning period</i>	years
214.	17. Alkamis- ja päättymisvuosi	
	<i>Planning period</i>	
215.	18. Hakuusuunnite	k-m ³
	<i>Planned cut</i>	solid cubic meters
	19. Kotitarvekäyttö	k-m ³
	<i>Home use of timber</i>	solid cubic meters
	20. Jää myytäväksi	k-m ³
	<i>Remains to be sold</i>	solid cubic meters
118.	21. Järeän puun osuus myytävästä määrästä	%
	<i>Ratio of heavy timber to the quantity to be sold</i>	per cent
119.	22. Havup. puun osuus	%
	<i>Ratio of soft pulpwood to the quantity to be sold</i>	per cent

- 220. 23. Muun puun osuus %
Ratio of other assortments to the quantity to be sold per cent
- 24. Talouskauden uudistusala ha
Regeneration area of the planning period hectares

Metsänkäytön rajoitukset 1. 1. 1969 (rastia käyttäen)
Restrictions of forest utilization (tick)

		Koko tilalla The whole farm	Osalla tilaa Part of the farm	Vapaa Free
222.	26. Asutuslakien mukaiset rajoitukset Restrictions based on settlement laws	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	26. Yksityismetsälain mukaiset rajoitukset Restrictions based on the private forestry law	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

App. 3. The major items of the factor scores representing the social structure of communes (OLAVI RIIHINEN 1970)

Liite 3. Kuntien sosiaalista rakennetta edustavien faktoripistemäärien (OLAVI RIIHINEN 1970) tärkeimmät komponentit

- 277. Centrality. Number of cultural services available in the main center (.96), number of miscellaneous services available in the main center (.95), number of medicinal services available in the main center (.93), number of retail trade services available in the main center (.90), number of administrative services available in the main center (.89), population of the main center of the commune (.77), proportion of the population living on cumulative industries (.67).
- 278. Regional development. Size of the dwellings (.78), number of telephones in ratio to the population (.73), proportion of the population cared for by the commune (-.70), proportion of electrified dwellings (.70), proportion of the population in active working age (.70), proportion of dwellings with indoor drainage (.66), number of cars in ratio to the population (.56).
- 280. Mobility. Outmigration (.79), proportion of the population borne outside the commune (.70), proportion of rented dwellings (.58), homogeneity in voting (-.53).
- 282. Expansiveness. Commuting traffic (.63), proportion of the population living on cumulative commercial services (.48).
- 283. Agricultural modernity. Size of the farms (.77), degree of mechanization in agriculture (.72).

App. 4. Means and standard deviations of the variables

Liite 4. Muuttujien keskiarvot ja hajonnat

Variable	Mean	Standard deviation	Variable	Mean	Standard deviation
6	6.19	2.48	70	.53	.50
7	5.06	2.36	73	.47	.50
10	5.30	2.16	79	68.39	36.51
13	4.85	2.16	83	14.78	21.06
14	4.41	1.95	86	3.28	1.34
19	2.77	1.28	87	2.82	1.13
20	4.76	1.42	88	1.82	.90
23	2.54	1.35	89	2.65	1.06
24	2.56	1.13	90	4.44	.99
25	3.17	1.28	91	4.29	1.07
26	4.03	1.12	92	2.24	.96
27	3.10	1.25	93	3.70	1.16
28	2.15	1.06	94	1.93	.98
29	2.36	1.02	95	2.83	1.22
30	3.85	1.23	96	1.95	.35
31	3.65	1.20	101	2.06	.79
32	2.85	1.38	116	.75	.43
33	2.28	1.22	201	17.75	14.76
34	2.89	.87	203	5.20	5.93
35	2.04	.92	205	19.60	23.77
36	4.01	.94	206	6.82	14.33
37	1.99	.89	207	2.26	1.48
38	2.81	1.13	209	2.07	1.39
40	4.20	1.07	211	.83	.99
41	5.22	1.91	212	10.03	2.95
42	3.14	1.05	213	36.19	6.48
43	3.30	1.43	222	1.74	.95
44	2.71	1.22	223	0.6	.28
45	3.16	1.27	224	2.47	1.01
46	5.23	1.66	228	49.17	11.50
47	5.25	1.80	238	2.43	.55
48	4.37	2.10	241	22.83	18.71
49	4.30	1.66	246	3.65	1.39
50	4.45	1.85	250	1.02	1.51
51	5.72	2.31	252	39.86	26.88
55	4.92	2.29	254	2.69	1.40
56	4.40	1.67	256	3.91	1.36
57	3.43	1.45	259	3.96	1.01
58	3.77	1.49	262	3.19	1.52
59	3.18	1.22	265	3.12	1.33
60	3.38	1.35	270	3.62	1.25
61	2.83	1.62	271	3.54	1.17
62	2.34	1.11	272	4.64	.79
63	2.76	1.02	273	3.96	1.15
64	1.79	.76	277	48.66	6.90
65	3.10	.99	278	44.86	10.12
66	1.96	.95	280	54.34	7.02
67	2.42	1.05	282	49.46	6.41
68	2.99	.99	283	53.31	7.55
69	2.63	1.07	284	.58	.49

App. 5. Correlation matrix of the variables I

Liite 5. Muuttujien korrelaatiomatriisi I

	6	7	10	13	14	19	20	23	24	25	26	27	28	29	30	31
6	1.00															
7	-.13	1.00														
10	-.19	-.22	1.00													
13	-.05	-.31	-.07	1.00												
14	-.21	-.11	-.08	-.01	1.00											
19	-.09	.07	-.02	.07	.03	1.00										
20	.12	-.07	-.00	-.06	.09	-.29	1.00									
23	-.00	-.09	.05	-.04	.04	-.17	-.11	1.00								
24	.03	.21	.00	-.14	.02	.04	-.09	-.06	1.00							
25	-.01	.01	-.06	.04	.00	-.00	.05	.01	-.17	1.00						
26	.04	-.17	-.01	.06	.03	-.10	.10	.01	-.28	-.29	1.00					
27	.01	-.04	.05	.03	-.05	-.00	-.02	.06	-.35	-.33	-.18	1.00				
28	-.07	-.01	.03	.00	.01	.07	-.06	-.04	-.15	-.32	-.19	-.22	1.00			
29	.00	-.01	.00	.01	.08	-.05	.03	.08	-.00	-.07	.11	-.00	-.03	1.00		
30	.08	-.11	.07	.05	-.07	-.01	-.03	.07	-.09	.04	.05	.00	-.01	-.17	1.00	
31	-.03	-.04	-.03	-.01	.01	-.01	-.02	-.04	-.01	-.01	.01	-.02	.05	-.05	-.40	1.00
32	-.00	.03	-.02	-.10	.02	-.00	.11	-.08	.03	-.02	-.06	.04	.01	-.32	-.20	-.33
33	-.04	.11	-.00	.07	-.04	.08	-.09	.02	.07	.06	-.08	-.02	-.03	-.25	-.24	-.16
34	.12	-.01	-.02	-.10	-.03	-.05	.04	-.04	.04	-.09	.02	.00	.04	.05	.01	-.01
35	.07	.03	-.09	-.06	.04	.01	.02	.06	.06	-.15	-.08	.06	.13	-.02	-.05	-.00
36	.11	.02	.01	-.06	.01	-.04	.01	.09	-.03	.02	-.01	.12	-.11	.01	.02	-.04
37	.01	.09	-.08	-.02	.06	.01	.01	.06	.00	-.01	-.13	.04	.10	.02	.04	-.08
38	-.08	-.10	-.07	-.04	-.11	.05	-.13	-.09	.05	-.05	-.04	-.05	.11	-.02	-.11	.18
40	.01	.00	.06	.03	.08	.01	.11	-.00	-.03	.02	.16	-.10	-.06	.01	.11	-.09
41	.06	-.02	-.04	.09	-.05	-.03	.01	.01	.05	.07	-.10	-.02	-.01	-.08	-.03	.02
42	-.02	.04	-.04	-.05	.01	.09	-.01	-.07	-.12	.02	.03	.04	.04	.02	.04	-.08
43	.02	-.01	-.08	.06	-.04	.04	-.03	.01	-.01	.03	-.05	.05	-.03	.02	.08	-.04
44	-.01	-.03	.02	-.00	.08	.02	-.03	.11	.02	-.00	-.04	-.05	.10	.04	-.04	.05
45	-.07	.02	-.00	-.02	-.02	-.02	-.02	-.02	-.04	-.02	.10	-.01	-.04	-.08	-.09	.03
46	-.04	-.03	.01	-.07	.02	-.07	.11	.02	-.05	-.00	.20	-.10	-.04	.06	.03	-.06
47	.04	.07	.08	-.02	.03	-.00	-.03	-.08	.06	-.07	-.10	.09	.02	.01	.02	.05
48	.01	.05	-.06	-.06	-.00	.05	.01	-.01	.15	.02	.01	-.07	-.10	-.02	-.03	-.04
49	.04	.10	-.09	.08	.02	.00	-.04	-.06	-.03	-.02	-.06	-.03	.16	.01	-.03	.04
50	.04	-.12	.04	.01	-.06	-.01	.02	-.15	.02	-.06	-.03	.04	.03	-.05	-.00	.06
51	-.02	-.09	-.01	-.03	-.04	-.04	.12	.05	-.08	.05	.06	-.04	.00	.09	.04	.03
55	.00	.01	.12	.03	-.00	-.05	.03	.05	-.07	-.01	.01	.10	-.05	.01	.05	-.07
56	.01	-.07	.05	-.07	.10	.02	.09	-.03	.00	-.02	-.01	.04	-.01	.08	.02	.02
57	-.05	.07	.00	-.03	.08	-.03	-.04	.01	.05	-.00	-.05	-.03	.04	-.06	-.02	.01
58	.00	.00	-.05	.03	.01	-.11	.12	-.02	-.05	.04	.09	-.04	-.05	.10	-.02	.02
59	.07	.06	.03	.03	-.22	.08	-.00	-.00	.03	.04	.02	-.03	-.06	-.04	-.03	-.02
60	.00	.03	-.08	.00	-.03	-.04	-.07	.07	-.06	.04	-.01	.01	.02	.00	.03	-.03
61	-.02	-.07	.05	.05	.01	.08	-.11	-.02	.03	-.07	-.03	.04	.05	-.09	.02	-.01
62	-.13	.06	-.01	-.06	-.06	-.03	-.12	-.02	.10	-.06	-.14	-.00	.11	-.01	-.06	.01
63	-.09	-.06	.01	-.03	.04	-.01	.13	-.09	-.02	.06	.10	-.02	-.13	.07	-.05	-.03
64	.01	.02	-.01	-.03	-.03	.03	.04	.04	-.01	.05	.01	-.06	.01	-.10	.06	.03
65	-.07	-.02	.00	.12	.05	.01	-.03	.08	-.08	-.03	.04	.07	.00	.02	.08	.00
66	.06	.06	-.00	-.07	.05	.00	.04	.12	-.03	.05	-.10	.01	.05	-.07	.07	-.05
67	.03	-.08	-.03	.08	-.07	.01	-.03	.03	.04	-.01	-.00	-.00	-.03	.02	.03	.04
68	-.17	-.08	.09	.00	.14	-.03	.04	.02	-.03	.00	.10	-.02	-.04	-.03	-.00	-.00
69	.09	.10	-.06	-.03	-.11	.02	-.05	-.16	.02	-.02	-.01	.01	.01	.06	-.09	.02

32	33	34	35	36	37	38	40	41	42	43	44	45	46	47	48	49	50	
32	1.00																	
33	-.33	1.00																
34	-.01	-.03	1.00															
35	.06	-.02	.14	1.00														
36	.03	-.03	.07	.01	1.00													
37	.02	.01	.02	.00	.05	1.00												
38	-.06	-.00	-.02	.01	-.36	-.27	1.00											
40	.07	-.09	-.00	.01	-.38	-.25	-.35	1.00										
41	.04	.01	.05	.01	.02	.07	-.06	-.00	1.00									
42	.02	.00	-.01	-.02	.03	-.01	-.12	-.04	-.08	1.00								
43	-.02	-.03	-.16	-.08	-.03	.16	-.02	-.00	-.03	-.19	1.00							
44	-.12	.09	-.03	.05	.06	-.00	-.09	-.04	-.03	-.15	-.16	1.00						
45	.05	.07	.09	-.02	.03	-.07	.10	-.04	-.20	-.13	-.12	-.21	1.00					
46	.00	-.02	.02	.00	-.15	-.12	.15	.05	-.44	.00	-.25	-.10	-.04	1.00				
47	.01	-.09	.03	.04	.05	-.03	.01	.04	-.39	-.15	-.20	-.17	-.14	-.16	1.00			
48	.07	.00	.00	.06	.05	-.06	.05	-.04	-.05	-.02	.04	.01	-.00	.01	.02	1.00		
49	-.06	.03	.07	.05	.01	.06	.01	-.08	.07	.00	.09	.04	.07	-.16	-.05	-.04	1.00	
50	.00	-.02	-.05	-.04	-.01	.00	.14	-.08	.03	.05	-.02	-.08	-.01	.03	-.03	-.24	-.05	1.00
51	-.02	-.12	-.02	-.05	-.05	-.03	-.00	.09	-.02	.03	-.00	-.04	-.02	.14	-.11	-.15	-.26	-.14
55	.01	.03	.06	.02	-.02	.00	-.02	.04	-.05	-.11	-.07	.06	-.05	.06	.12	-.22	-.23	-.15
56	-.04	-.06	-.12	-.02	-.01	.07	-.09	.09	.01	.03	.14	-.03	-.05	.01	-.09	-.04	-.05	.04
57	.05	-.00	.02	-.01	.07	.15	.01	-.13	-.00	.03	-.03	-.03	-.01	.01	.04	.10	.05	.00
58	-.01	-.07	.01	.00	.01	-.09	-.01	.06	-.03	-.01	-.05	.00	.02	.04	.02	-.11	.04	.11
59	.07	.02	-.08	-.05	.07	-.09	-.01	-.05	-.04	-.08	.06	.07	-.01	.02	-.03	.10	-.04	-.10
60	-.04	.04	.09	-.00	-.02	.03	-.00	-.07	.02	.07	-.10	.06	-.01	.01	-.02	-.01	-.03	.01
61	-.02	.09	.09	.07	-.10	-.07	.09	.07	.03	-.05	-.03	-.05	.05	-.08	.08	-.02	.03	-.08
62	.02	.03	-.08	.10	-.02	.03	.09	-.07	.09	-.09	.10	.02	-.09	-.06	.02	.03	.04	.05
63	-.00	.03	-.07	-.04	-.07	-.08	-.00	.09	-.07	.06	.02	.01	.10	.04	-.10	.00	-.03	-.00
64	.05	-.04	.13	.02	.01	-.05	-.01	-.02	.02	-.02	-.13	.13	.04	.00	-.04	.07	-.00	-.00
65	-.05	-.03	.06	-.09	.08	.09	-.09	-.00	-.05	.06	-.03	-.13	-.04	.03	.11	-.09	-.01	-.05
66	.04	-.03	.03	.05	.04	.11	-.08	-.05	.07	.05	-.00	.08	-.09	-.04	-.05	-.01	.08	-.07
67	-.04	-.02	.02	.01	-.02	-.03	.12	-.04	.08	-.04	.01	-.01	-.04	.02	-.08	.01	-.09	.04
68	.02	.03	-.06	-.08	-.05	-.03	-.10	.09	-.12	.17	-.08	-.07	.05	.03	.05	.03	-.01	-.08
69	-.01	.02	.01	.03	.03	-.03	.04	.01	-.04	-.17	.07	.01	.05	-.00	.07	-.02	.03	.10

51	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	
51	1.00															
55	-.29	1.00														
56	.09	.01	1.00													
57	-.09	-.01	-.27	1.00												
58	-.02	-.03	-.37	-.14	1.00											
59	.03	-.03	-.12	-.17	-.12	1.00										
60	.08	-.05	-.13	-.24	-.16	-.13	1.00									
61	-.09	.09	-.27	-.16	-.20	-.26	-.24	1.00								
62	-.17	.03	.18	.01	-.11	.06	-.10	-.06	1.00							
63	.03	-.00	-.09	.05	.14	-.07	-.15	.10	-.41	1.00						
64	.06	-.06	-.16	-.00	-.02	.08	.20	-.04	-.41	-.16	1.00					
65	.11	.01	.02	-.06	-.00	-.06	.11	-.02	-.38	-.44	-.15	1.00				
66	-.01	.01	-.00	.08	-.11	.04	.07	-.06	.07	-.01	.09	-.14	1.00			
67	.20	-.08	-.01	-.04	.01	-.01	.11	-.05	-.03	-.11	.09	.08	-.28	1.00		
68	-.04	-.02	.06	-.06	-.01	-.03	-.05	.08	-.06	.12	-.07	.01	-.23	-.42	1.00	
69	-.15	.08	-.03	.03	.08	.01	-.11	.02	.04	.01	-.10	.03	-.41	-.34	-.31	1.00

App. 5 (Cont.) Correlation matrix of the variables II

Liite 5 (jatkoa). Muuttujien korrelatiomatriisi II

	6	7	10	13	14	19	20	23	24	25	26	27	28	29	30	
70	.09	-.08	-.10	-.00	-.01	-.01	-.02	-.14	-.05	-.03	.04	.06	-.01	-.04	.02	70
73	-.05	-.01	-.08	-.01	.06	.08	-.04	.03	.06	-.05	.02	-.06	.05	.02	-.09	73
79	-.00	-.12	.04	.02	-.10	-.07	-.06	-.01	-.05	-.06	.13	-.02	.01	.06	.04	79
83	.05	-.04	-.06	-.00	.11	.09	.05	-.04	.01	.07	-.16	.01	.07	-.06	.01	83
86	.13	.00	-.08	-.05	-.05	-.06	-.01	-.10	.02	-.01	-.06	-.09	-.05	-.09	-.03	86
87	.03	-.01	.17	-.04	-.04	-.10	.04	.07	-.03	.05	.08	-.09	-.01	.10	.06	87
88	-.10	-.00	.02	.09	.12	.08	-.03	-.01	.02	-.07	-.05	-.07	.20	.04	-.03	88
89	-.03	.00	-.01	.06	.01	.07	.05	.01	.03	-.08	.04	.02	-.01	.00	-.07	89
90	-.07	-.01	-.10	-.04	-.00	.05	-.06	.06	-.04	.09	.01	.02	-.10	-.03	.09	90
91	.08	-.18	.09	.09	-.09	-.09	.04	.14	-.13	-.01	.27	-.07	-.06	.04	.16	91
92	.09	.07	-.04	-.08	.01	-.03	.04	-.01	-.01	.01	.06	-.04	-.00	.11	.04	92
93	-.13	.03	-.03	-.03	.10	-.08	-.03	-.18	.05	-.14	-.03	.07	.06	-.07	-.12	93
94	-.08	.05	.02	-.03	-.02	.10	-.02	.04	.02	.11	-.06	-.07	-.02	-.04	-.01	94
95	.05	.03	-.04	.03	-.00	.10	-.02	.02	.05	.05	-.20	.08	.02	-.02	-.05	95
96	.01	.04	.01	-.02	.01	.06	-.12	.00	.02	-.06	-.08	.07	.05	.00	-.00	96
101	-.03	.01	.11	-.01	-.00	.06	.02	.07	-.09	.03	.04	.03	-.02	-.02	-.01	101
116	.03	-.15	.08	-.05	.10	-.03	.15	.06	-.12	.05	.34	-.07	-.20	.09	.13	116
201	.07	-.05	.15	-.03	-.08	.00	.07	.21	-.12	-.02	.09	.00	.05	-.01	.15	201
203	-.15	.18	-.10	-.14	.18	-.01	.04	-.08	.15	-.01	.01	-.07	-.07	-.02	-.04	203
205	-.02	.09	.02	-.03	-.01	-.01	.08	-.01	.06	-.03	-.03	-.02	.04	.11	-.01	205
206	-.04	.07	.01	-.03	.16	.10	-.10	.06	.01	.03	-.01	.01	-.05	.01	-.01	206
207	.03	.01	-.08	-.02	.10	-.02	.02	-.09	.06	.01	-.00	-.01	-.04	-.06	-.05	207
209	-.06	.02	.03	-.01	-.06	.08	.01	-.03	-.05	-.04	.05	.07	-.05	.04	-.06	209
211	-.00	.04	-.10	-.01	.05	.13	-.00	-.07	.02	-.07	-.04	.03	.07	-.08	-.09	211
212	-.15	.04	.07	.00	-.01	-.01	.00	.13	-.14	.03	.06	.05	-.02	.04	.01	212
213	.06	.00	.08	.02	-.04	-.03	.08	.07	.02	.06	.00	-.03	-.07	-.06	.11	213
222	.18	-.06	-.19	.12	-.08	-.04	-.13	-.11	.12	-.08	-.08	.05	-.01	.02	-.04	222
223	-.03	.04	.03	.00	.03	.06	.02	.05	.00	-.04	-.03	.10	-.04	.05	-.02	223
224	-.03	.00	.04	-.02	-.10	.01	-.01	.17	-.12	.02	-.03	.05	.08	-.02	.03	224
228	-.07	.06	-.06	.02	.04	.09	-.05	-.12	.12	-.04	-.08	-.06	.07	-.09	-.01	228
238	-.02	-.02	.01	-.07	.02	-.03	-.05	-.03	.00	-.01	.04	-.06	.04	-.01	.08	238
241	-.05	-.00	-.13	-.08	.03	-.04	-.07	-.24	.21	-.01	-.06	-.04	-.09	-.04	-.07	241
246	-.00	.05	.10	-.12	.06	.03	.08	.18	-.09	.01	.00	.03	.05	.01	.06	246
250	-.02	.02	-.08	.06	-.03	.05	-.08	-.00	-.00	.00	.04	-.08	.05	-.01	-.03	250
252	.05	.01	-.11	-.06	.00	-.00	-.04	-.14	.11	.00	-.02	-.08	-.00	.06	-.09	252
254	.04	.13	-.11	-.03	-.04	-.01	-.11	-.03	.11	.03	-.13	.06	-.08	-.09	-.06	254
256	.09	.11	-.11	-.03	-.02	.10	-.08	-.12	.20	-.07	-.15	-.06	.11	-.13	-.08	256
259	.05	-.06	-.02	-.03	-.00	-.04	-.01	.07	.10	-.04	-.02	-.10	.08	-.04	-.01	259
262	-.05	.04	-.10	-.07	.05	.13	-.07	-.03	.12	.02	-.15	-.03	.04	-.08	-.07	262
265	.04	.03	-.07	-.08	-.03	.02	-.02	-.13	.01	.09	.00	-.14	.04	.01	-.11	265
270	.01	.12	-.01	-.11	-.02	.01	-.09	-.08	.14	-.10	-.09	.04	.01	.02	-.08	270
271	.05	-.08	.01	-.03	-.02	-.13	-.04	-.07	.06	.00	.01	-.09	.04	-.04	-.05	271
272	-.02	-.05	.03	.01	.03	.07	-.14	-.02	.00	-.05	-.07	.02	.10	-.11	-.01	272
273	-.00	.03	-.08	-.08	.01	.01	-.03	-.04	.21	.02	-.17	-.07	.02	-.04	-.06	273
277	-.06	.04	.04	-.05	-.01	.07	.11	-.02	.04	.05	-.01	-.04	-.06	-.01	-.13	277
278	.00	.03	.07	.13	-.06	.04	-.01	.18	-.13	.04	-.01	.05	.05	-.02	.16	278
280	.04	-.05	-.02	.07	.00	-.01	-.03	.14	-.05	-.02	.05	-.02	.05	-.01	.08	280
282	.01	.01	.02	.04	-.02	.04	-.06	.15	-.07	.00	.07	-.02	.01	-.02	.13	282
283	.00	-.01	.06	.13	-.11	.05	.10	.13	-.15	.01	.02	.03	.09	-.09	.13	283
284	-.01	-.00	.08	.17	-.11	.01	.01	.19	-.16	.00	.04	.04	.07	-.03	.17	284
	6	7	10	13	13	19	20	23	24	25	26	27	28	29	30	

	31	32	33	34	35	36	37	38	40	41	42	43	44	45	46	47	
70	.13	-.10	-.01	.05	-.03	-.13	.04	.07	.01	.05	-.06	.17	-.01	.00	-.06	-.06	70
73	.15	-.08	.02	.05	-.03	.00	.04	.10	-.09	-.08	.02	-.05	.06	.02	.06	-.02	73
79	.07	-.13	-.03	-.04	-.08	-.15	-.03	.16	.02	-.05	.02	.00	-.09	.03	.04	.05	79
83	.06	-.01	-.01	-.08	.03	.02	-.06	.03	-.02	-.08	.06	.01	-.01	.06	-.06	.06	83
86	-.07	.11	.04	.05	.05	.06	.06	.04	-.09	.08	.02	.01	-.09	.01	-.04	-.01	86
87	-.03	-.06	-.03	.06	-.03	.01	.01	-.11	.04	-.02	.00	-.04	-.02	-.02	.02	.07	87
88	.05	-.09	.04	-.07	.05	-.04	.03	-.02	-.04	-.01	.07	.06	.12	.05	-.07	-.12	88
89	.07	.01	.01	-.04	-.00	.00	-.04	.01	-.00	-.03	-.02	-.13	.10	-.05	.10	-.01	89
90	.01	-.01	-.06	-.03	-.07	-.06	-.07	.08	.10	-.05	-.07	.11	-.07	.04	-.02	.04	90
91	-.08	-.05	-.03	.00	-.17	.12	-.01	-.05	.00	.06	.04	.00	-.08	.01	.04	-.09	91
92	-.02	-.09	-.01	.08	.06	.02	.01	-.09	.08	-.11	.03	-.03	.08	-.00	.12	-.03	92
93	.05	.06	.05	.03	.08	.00	-.13	.11	-.06	-.04	.01	-.06	-.08	.13	-.04	.08	93
94	-.03	-.00	.08	-.13	-.05	-.08	.01	-.02	-.03	-.00	.15	.00	.02	.02	-.03	-.09	94
95	.06	.06	-.07	.01	.05	-.06	.12	.02	.02	.06	-.19	.08	.07	-.16	-.05	.10	95
96	.02	.00	-.02	.02	.02	.05	-.01	.00	-.02	-.01	.05	.07	-.00	-.08	-.08	.08	96
101	-.06	.07	.02	-.01	-.02	.09	-.04	-.12	.06	-.03	.13	-.07	.04	.08	.05	-.12	101
116	-.08	-.06	-.04	.01	-.13	-.01	-.05	-.18	.16	-.07	.19	-.12	.08	.24	.03	-.18	116
201	-.14	-.00	.01	.07	-.01	.03	.09	-.09	.04	-.05	.06	-.12	.08	.05	.11	-.08	201
203	-.06	.04	.07	-.03	-.03	-.07	-.11	.04	.03	-.06	-.01	.04	-.02	.07	.01	.00	203
205	-.02	-.11	.07	.07	.02	.00	-.08	.02	-.01	-.02	.00	-.11	.05	-.04	.07	.05	205
206	-.05	.03	.00	-.06	-.03	.02	-.01	-.02	.06	-.06	.03	.04	-.03	-.04	.03	.04	206
207	.11	-.04	.02	-.10	-.01	.03	-.07	.05	-.04	-.04	.06	.07	-.02	.08	-.11	.02	207
209	-.04	.06	.01	.09	.08	-.06	-.00	-.02	.00	.03	-.03	-.09	.01	.02	.10	-.05	209
211	-.01	.08	.09	-.04	.05	.09	-.01	-.00	-.03	-.05	.10	-.01	-.02	.07	.00	-.02	211
212	-.04	.04	-.04	.05	-.01	-.04	.05	-.06	.03	-.07	.05	-.17	.04	-.00	.21	-.05	212
213	.02	-.09	.04	-.08	-.04	-.05	.02	-.11	.11	.15	.01	-.01	.01	-.04	-.04	-.10	213
222	.13	-.06	-.06	.00	.07	-.02	-.09	.14	-.05	.07	-.11	.18	-.13	.06	-.10	-.01	222
223	.04	-.04	-.01	.05	.13	.07	-.02	-.02	-.04	-.05	.02	-.01	.00	-.01	.03	.03	223
224	-.10	.11	-.05	.03	.01	.08	.08	-.11	.01	.00	.07	-.05	.02	-.05	.03	-.02	224
228	-.01	-.01	.10	.03	.05	-.05	.01	.02	-.02	-.03	.00	.04	-.03	-.08	-.00	.06	228
238	.04	-.11	-.00	.01	-.04	-.10	.07	.11	.00	-.01	-.07	.05	-.07	-.04	.06	.03	238
241	.09	.00	.00	.02	-.02	-.09	-.04	.20	-.09	.05	-.11	.09	.00	.03	-.09	-.01	241
246	-.08	.00	.03	.06	.05	-.02	.08	-.11	.05	-.00	.09	-.19	.04	-.01	.11	-.02	246
250	-.04	.02	.04	-.07	.03	.02	.01	.12	-.11	-.03	-.04	.07	-.01	.04	.00	-.02	250
252	.05	.05	-.09	.01	.01	-.01	-.07	.14	-.06	.05	-.03	.14	-.02	.03	-.08	-.04	252
254	.04	.03	.04	.07	.09	.12	-.04	.03	-.12	.05	-.06	.02	.02	-.03	-.09	.06	254
256	.05	.02	.10	.07	.09	.00	.03	.12	-.15	.09	-.12	.05	.02	-.03	-.15	.07	256
259	.04	.01	-.01	-.06	.03	.08	.06	.01	-.06	.05	.00	-.04	.01	-.04	-.05	.03	259
262	-.04	.17	-.03	.02	.10	.14	.02	-.01	-.10	.07	-.02	-.05	.04	-.06	-.03	.06	262
265	.02	-.07	.14	-.09	.01	-.01	-.01	.11	-.06	-.03	.03	-.04	-.04	-.01	.07	.01	265
270	.04	-.03	.06	.04	.06	.03	.08	.08	-.18	.04	.02	.19	-.07	-.10	-.05	-.03	270
271	.05	-.03	.05	.06	-.02	.02	-.03	-.00	-.00	-.01	-.07	-.08	-.03	.05	.08	-.01	271
272	.14	-.15	.12	.04	-.07	-.01	.03	.07	-.09	-.01	-.08	.05	.01	-.09	-.05	.10	272
273	.04	.04	-.00	.10	.04	-.07	.08	.09	-.05	.14	-.12	.13	-.05	-.08	-.07	-.01	273
277	.04	.08	.02	-.05	-.02	.05	-.01	.01	-.06	.03	.09	.02	-.04	.09	-.08	-.05	277
278	-.09	-.09	.06	-.03	.01	-.04	.09	-.15	.07	.01	.06	-.11	.05	-.05	.04	-.02	278
280	-.01	-.05	.01	.06	.08	.04	.04	-.09	.03	-.02	.07	-.12	.08	-.05	.10	-.08	280
282	-.03	-.06	-.01	-.05	.05	.08	.05	-.16	.11	-.02	.06	-.12	.04	-.09	.04	.04	282
283	-.08	-.04	.09	.01	.00	.03	.10	-.13	.04	-.05	.10	-.09	-.02	.05	.02	-.00	283
284	-.11	-.08	.07	-.01	-.00	-.03	.11	-.15	.06	.02	.05	-.15	.05	-.05	.05	-.02	284
	31	32	33	34	35	36	37	38	40	41	42	43	44	45	45	47	

	48	49	50	51	55	56	57	58	59	60	61	62	63	64	65	
70	-.01	.09	-.08	-.03	-.02	.16	.03	-.10	-.09	-.06	.02	.07	-.03	-.03	-.03	70
73	-.03	-.06	-.04	.10	-.01	.02	-.00	-.01	.16	-.00	-.13	-.13	.07	.12	-.01	73
79	-.05	-.03	.11	.01	-.02	.00	-.11	-.02	-.04	.04	.10	-.02	.04	-.06	.03	79
83	-.04	-.07	-.01	.05	-.06	.05	.00	.03	-.07	-.10	.06	-.00	-.01	-.07	.07	83
86	-.00	.07	-.02	-.00	.06	.01	-.05	.04	-.11	-.08	.15	-.01	.04	-.08	.03	86
87	.03	-.02	-.06	.03	-.03	.05	-.02	-.01	.01	.05	-.07	-.04	.02	-.01	.02	87
88	.01	-.00	.11	-.10	-.06	.01	.12	-.01	.04	.02	-.15	.02	-.02	.05	-.04	88
89	-.03	-.04	-.00	.04	.02	-.02	-.02	-.02	.06	-.02	.03	-.00	-.02	.04	-.01	89
90	-.00	-.03	-.00	.02	-.01	-.07	.00	.00	.05	.06	-.02	.04	-.04	.03	-.03	90
91	.01	-.04	-.01	.10	.03	-.00	-.06	-.05	.06	-.00	.07	-.09	.11	-.02	.00	91
92	-.04	-.00	-.03	.02	-.02	.03	.14	-.01	-.01	-.07	-.09	.06	.02	-.04	-.06	92
93	.03	.02	.02	-.00	-.13	.06	-.03	.05	-.12	.03	-.02	.01	-.07	-.01	.06	93
94	-.03	.02	.06	.00	-.01	.05	-.10	.01	.07	.05	-.07	-.07	.06	.05	-.02	94
95	.02	.00	-.02	-.11	.13	-.12	.05	-.00	.01	-.01	.08	.07	-.09	.02	-.00	95
96	-.02	.04	.00	-.00	-.01	-.03	.03	-.08	.05	.01	-.01	-.04	-.01	.05	.06	96
101	-.02	.05	.06	-.07	.13	-.08	.03	.08	.02	-.01	-.02	-.17	.12	-.01	.08	101
116	-.02	-.07	.02	.11	-.04	.11	-.07	.03	-.03	-.01	-.05	-.12	.19	-.01	.02	116
201	.04	-.02	-.01	.02	.03	-.13	-.03	.00	.05	.10	.04	-.07	.04	.15	-.08	201
203	.00	-.02	-.08	-.03	.02	.05	.02	.09	-.04	-.07	-.06	-.02	-.01	-.02	.05	203
205	-.03	.10	-.05	-.02	.06	-.07	.07	.10	.04	-.07	-.06	.01	-.05	-.01	.05	205
206	-.05	-.00	-.05	-.03	-.05	.02	.07	.05	-.02	-.03	-.09	.09	-.04	-.09	.01	206
207	.05	.14	.05	-.07	-.14	-.04	.00	.03	-.04	.00	.04	-.05	.00	.07	-.00	207
209	-.02	-.05	-.10	.07	.11	-.00	.01	-.04	.11	-.03	-.02	-.03	-.00	.05	-.01	209
211	-.01	-.01	.06	.05	-.04	.10	.07	-.05	.01	-.15	-.01	.05	.03	-.01	-.09	211
212	-.09	-.10	-.11	.07	.11	-.06	-.05	-.02	-.00	.19	-.03	-.04	.03	-.02	.03	212
213	-.01	.05	-.00	-.01	-.06	.07	.00	.02	-.06	-.01	-.04	-.00	.03	.01	-.03	213
222	-.03	.00	.16	.04	-.10	.00	-.00	-.02	.01	-.08	.08	.07	-.09	-.02	.03	222
223	-.04	-.05	-.01	-.01	.07	.03	.02	.03	.03	-.09	-.02	.04	-.01	-.01	-.02	223
224	-.03	.00	-.05	.03	.00	-.05	-.01	-.10	.04	.12	.02	-.03	-.01	.12	-.05	224
228	.03	.08	-.07	-.12	.04	.05	.10	-.07	-.06	-.03	-.01	.06	-.02	-.01	-.04	228
238	-.05	-.11	.02	-.01	-.01	-.06	.03	.01	-.06	-.01	.08	.04	-.02	.04	-.06	238
241	.06	-.02	.02	-.04	-.02	.05	.02	-.02	-.03	-.08	.03	.06	.00	-.08	-.01	241
246	.00	.02	-.07	.03	.02	-.04	.05	-.02	.01	.08	-.05	-.12	.08	.07	.00	246
250	-.03	.04	.02	-.00	.05	-.02	-.06	.04	-.03	-.05	.11	.04	-.02	-.12	.07	250
252	-.02	.06	.16	-.03	-.06	-.01	.06	.09	-.00	-.10	-.05	-.00	.03	.05	-.07	252
254	.02	.08	.07	-.08	-.08	-.03	.05	.01	.01	.01	-.03	.08	-.07	.08	-.08	254
256	-.01	.07	.02	-.19	.01	-.02	.15	-.10	.02	-.06	.02	.12	-.09	.04	-.08	256
259	-.00	-.02	.11	-.02	-.02	.02	.06	-.01	-.12	.07	-.03	.00	-.05	.01	.04	259
262	.09	.01	-.06	-.09	-.01	.03	.03	-.11	.01	-.01	.05	.10	-.06	.06	-.09	262
265	-.06	.02	.03	-.03	.02	-.08	.04	.08	-.02	-.13	.10	.11	.01	-.05	-.10	265
270	-.08	.18	.08	-.15	.04	-.02	.13	.02	-.03	-.11	-.00	.11	-.02	-.02	-.08	270
271	.00	.10	.04	.04	-.10	.06	.01	.03	-.09	-.03	-.00	.02	-.04	.00	.01	271
272	-.12	-.04	.10	-.10	.04	-.10	.09	.07	-.05	-.14	.11	.08	-.02	-.03	-.04	272
273	.01	.05	-.04	-.02	-.05	-.03	.17	-.04	-.00	-.14	.03	.17	-.05	-.02	-.12	273
277	.02	-.10	.00	.08	-.03	.11	.08	-.01	-.04	-.05	-.10	.10	.03	-.07	-.08	277
278	-.03	.02	-.04	.00	.01	.00	-.11	-.06	-.02	.22	-.03	.04	-.11	.01	.06	278
280	-.06	-.01	-.09	.07	.06	-.07	-.04	.00	.06	.08	-.01	-.12	.10	.04	-.01	280
282	.01	.02	-.09	.01	.06	-.07	-.10	.01	.09	.09	.01	-.07	.03	.02	.03	282
283	-.07	.01	-.01	.05	.04	.00	-.08	-.06	-.01	.15	.01	-.01	-.05	.04	.01	283
284	-.06	.04	-.00	-.00	.04	-.02	-.13	-.04	-.00	.23	-.01	-.02	-.08	.04	.08	284
	48	49	50	51	55	56	57	58	59	60	61	62	63	64	65	

	66	67	68	69	
70	-.10	.05	-.05	.10	70
73	.03	.16	-.14	-.05	73
79	-.10	-.05	.02	.10	79
83	-.07	.02	.03	.01	83
86	.01	-.01	-.08	.06	86
87	.02	-.08	.03	.04	87
88	-.06	-.05	.02	.08	88
89	.05	-.00	.10	-.13	89
90	-.05	.14	-.04	-.05	90
91	.00	.15	-.04	-.12	91
92	-.06	-.06	.07	.06	92
93	-.06	-.01	-.03	.10	93
94	.11	-.08	.12	-.14	94
95	.01	-.02	-.08	.08	95
96	.08	-.06	-.07	.04	96
101	.07	-.04	.03	-.06	101
116	.00	-.01	.13	-.11	116
201	.21	-.10	.09	-.17	201
203	-.01	-.03	-.06	.09	203
205	.08	-.04	.03	-.06	205
206	.01	-.01	.10	-.08	206
207	-.09	.05	-.07	.09	207
209	.08	-.00	.01	-.08	209
211	-.08	.08	-.01	-.01	211
212	.18	-.08	.10	-.18	212
213	.11	-.02	.05	-.12	213
222	-.18	.13	-.21	.23	222
223	.01	.01	.06	-.10	223
224	.21	-.08	.07	-.16	224
228	-.02	.00	-.08	.09	228
238	.02	-.01	.01	-.03	238
241	-.13	.01	-.11	.20	241
246	.20	-.11	.18	-.23	246
250	-.11	.08	-.08	.09	250
252	-.08	.11	-.21	.19	252
254	-.03	.10	-.14	.06	254
256	.04	.03	-.16	.08	256
259	-.05	.08	.01	-.02	259
262	-.02	-.04	.05	.02	262
265	-.05	-.03	-.01	.08	265
270	-.01	.00	-.09	.08	270
271	-.06	.02	.06	-.01	271
272	-.10	.11	-.02	-.01	272
273	-.03	.09	-.05	-.01	273
277	-.13	.05	.14	-.07	277
278	.16	-.09	.12	-.19	278
280	.06	.04	.05	-.16	280
282	.08	-.04	.06	-.11	282
283	.10	-.11	.18	-.17	283
284	.17	-.09	.12	-.20	284
	66	67	68	69	

App. 5 (Cont.) Correlation matrix of the variables III

Liite 5 (jatkoa). Muuttujien korrelaatiomatriisi III

	70	73	79	83	86	87	88	89	90	91	92	93	94	95	96	101
70	1.00															
73	-.01	1.00														
79	.08	-.01	1.00													
83	-.01	-.06	-.20	1.00												
86	.07	-.04	.04	-.01	1.00											
87	-.10	-.05	.05	-.08	-.38	1.00										
88	.01	.01	-.07	.06	-.29	-.16	1.00									
89	-.04	.02	-.05	.05	-.36	-.17	-.22	1.00								
90	.05	.08	.01	-.00	-.27	-.30	-.09	-.19	1.00							
91	-.06	.03	.23	-.29	.03	.04	-.19	-.02	.11	1.00						
92	.06	-.09	-.01	.16	-.13	.08	.03	.12	-.10	-.15	1.00					
93	.13	.05	-.03	.13	.08	.01	.01	-.04	-.08	-.38	-.17	1.00				
94	-.09	.05	-.10	-.03	-.07	.04	.08	-.02	.01	-.15	-.33	-.14	1.00			
95	-.04	-.04	-.07	.03	.06	-.14	.06	-.02	.05	-.27	-.23	-.37	-.28	1.00		
96	-.06	.01	.15	.04	.11	-.02	.08	-.16	-.02	.03	-.09	.07	-.06	.03	1.00	
101	-.14	.07	-.04	-.05	-.05	.05	.09	.07	-.15	.05	-.03	-.06	.18	-.11	.13	1.00
116	-.05	-.02	.11	.04	-.08	.13	-.04	.01	-.01	.24	.19	-.05	.04	-.35	-.07	.09
201	-.28	-.16	.00	-.24	-.06	.13	-.03	.10	.10	.28	-.02	-.25	.11	-.07	-.00	.19
203	-.08	.15	-.26	.23	-.04	-.05	.08	-.04	.09	-.33	-.05	.18	.10	.07	-.08	-.03
205	.01	.03	-.13	.09	-.08	.01	.00	.06	.02	-.09	.03	.01	.02	.03	.07	.02
206	-.17	.01	-.15	.21	-.08	.03	.00	.01	.05	-.17	.13	-.02	-.00	.07	-.01	-.01
207	.10	.14	-.11	.17	.08	-.08	-.02	.05	-.04	-.14	.06	.08	-.13	.11	.03	-.12
209	-.01	.04	.11	-.06	-.05	.00	.04	.06	-.05	-.08	.07	-.03	.09	-.03	-.03	.14
211	-.02	.01	-.10	.12	.02	-.11	.04	.04	.01	.03	-.03	.02	.06	-.07	-.02	.06
212	-.16	-.12	.16	-.23	-.06	.12	-.04	.06	-.09	.10	.03	-.09	.07	-.09	-.01	.21
213	.07	-.06	.02	-.06	.03	-.02	-.03	-.01	.03	.08	-.00	-.11	.11	-.05	-.01	-.05
222	-.17	.08	.17	.17	.14	-.18	.02	-.10	.10	-.08	.01	.16	-.23	.09	.05	-.18
223	-.09	-.08	-.08	.26	-.05	.06	.07	.07	-.14	-.15	.16	.02	-.05	.03	-.03	-.10
224	-.20	-.13	.04	-.25	-.08	.12	-.08	.14	-.09	.18	.02	-.19	.11	-.08	.00	.15
228	.09	-.05	-.01	-.04	.05	-.09	.05	-.10	.10	-.20	.04	.07	-.10	.16	.10	-.03
238	-.06	-.06	.12	-.10	.02	-.01	-.06	-.04	.08	.14	.01	-.06	-.10	-.00	-.08	-.11
241	.27	.16	.01	.12	.10	-.17	.01	-.08	.12	-.22	-.05	.17	-.04	.10	-.07	-.14
246	-.19	-.01	-.01	-.14	-.12	.12	-.08	.18	-.09	.11	-.01	-.17	.18	-.07	-.03	.09
250	.03	-.04	.06	.03	.07	-.07	-.03	-.06	.07	.04	-.05	-.03	.03	.01	-.02	.01
252	.15	.17	-.07	.05	.00	-.11	.10	-.07	.12	-.07	.01	.03	-.05	.06	-.04	-.08
254	.04	.07	-.11	.05	.15	-.04	.00	-.13	-.03	-.16	-.04	.11	-.09	.13	.10	-.11
256	.12	.02	-.05	.03	.11	-.12	.09	-.12	.03	-.19	-.00	.08	-.01	.10	.05	-.14
259	-.02	.01	.00	.02	-.08	.02	.01	.07	.00	-.01	.04	-.07	.11	-.05	-.10	-.04
262	.04	-.06	-.04	.01	.04	-.06	-.01	.01	.01	-.15	-.06	.06	.05	.08	-.03	-.02
265	.00	.03	.05	.00	.01	-.07	-.04	.01	.08	.01	.06	-.06	-.03	.03	-.05	-.09
270	.06	-.07	.01	-.04	.09	-.12	.04	-.06	.03	-.05	-.03	-.04	.02	.10	.11	-.03
271	.05	-.11	-.01	.01	.01	-.03	.01	.01	-.00	-.03	.06	.06	-.06	-.03	-.13	-.24
272	.11	.06	.08	-.02	.03	-.08	.01	.03	-.01	-.03	.04	-.04	-.03	.05	.06	-.03
273	.05	-.03	-.09	-.01	-.07	-.10	.06	-.07	.21	-.06	.09	-.05	-.03	.07	-.01	-.15
277	-.10	-.06	-.13	.25	-.11	-.04	.04	.13	.03	-.08	.16	-.07	.04	-.02	.01	-.06
278	-.18	-.27	.12	-.13	-.11	.20	-.02	.04	-.09	.13	-.02	-.10	.14	-.12	.07	.13
280	-.09	.00	.05	-.11	.07	-.01	-.01	-.03	-.05	.15	.04	-.10	-.09	.01	-.03	.04
282	-.11	.00	.07	-.15	.12	-.03	-.06	-.05	-.02	.18	-.05	-.10	-.05	.02	.04	.12
283	-.10	-.22	.12	-.08	-.04	.12	-.02	.04	-.10	.15	-.01	-.08	.11	-.14	.09	.12
284	-.13	-.22	.17	-.22	-.06	.19	-.03	.01	-.11	.18	-.05	-.09	.12	-.13	.04	.16

	116	201	203	205	206	207	209	211	212	213	222	222	224	228	238	241	
116	1.00																116
201	.11	1.00															201
203	.02	-.31	1.00														203
205	-.01	-.04	.27	1.00													205
206	.02	-.10	.23	-.04	1.00												206
207	-.10	-.21	.16	.06	.05	1.00											207
209	.08	.08	.02	.10	-.01	-.41	1.00										209
211	.00	-.17	.08	-.04	.11	-.09	-.08	1.00									211
212	.13	.37	-.20	-.09	-.08	-.59	.46	-.20	1.00								212
213	.02	.09	-.14	.05	-.16	.02	-.09	-.10	-.04	1.00							213
222	-.19	-.41	-.06	-.16	-.06	.27	-.25	.07	-.38	-.16	1.00						222
223	.03	-.08	.06	.01	.45	.14	.00	.14	-.05	-.17	.00	1.00					223
224	-.06	.52	-.37	-.13	-.15	-.15	.11	-.15	.32	.08	-.27	-.19	1.00				224
228	-.25	-.08	.02	-.04	.03	.01	-.03	.01	-.07	.06	.11	-.07	.08	1.00			228
238	-.05	.15	.07	.08	.04	-.06	.02	-.09	.12	.05	-.16	-.04	.12	.11	1.00		238
241	-.11	-.53	.43	.07	-.04	.13	-.04	.02	-.26	-.01	.30	-.05	-.42	.15	.00	1.00	241
246	.14	.43	-.14	.04	.02	-.12	.08	-.07	.26	.17	-.43	.01	.33	-.09	.11	-.46	246
250	-.08	-.11	.00	.07	-.10	-.05	.01	.09	-.03	-.08	.08	-.02	-.07	.05	-.07	.16	250
252	-.08	-.31	.26	.04	.03	.21	-.06	.11	-.36	-.27	.21	-.09	-.27	-.02	-.01	.30	252
254	-.15	-.17	.11	.04	-.03	.18	-.02	-.01	-.12	-.12	.15	.05	-.10	.03	.15	.14	254
256	-.19	-.17	.10	.01	-.08	.07	-.02	-.06	-.08	-.05	.11	-.01	-.07	.27	.11	.19	256
259	-.03	.03	.04	-.05	-.02	.13	-.09	.00	-.17	.09	.01	-.00	.06	.00	.06	-.06	259
262	-.21	.07	-.02	-.02	-.05	-.06	-.01	.01	.02	-.04	-.02	.01	.01	.14	-.03	-.00	262
265	-.10	-.00	.09	-.00	.05	.05	.01	.04	-.00	-.05	-.01	.04	-.05	.03	.21	.09	265
270	-.25	-.10	.00	.00	-.02	.04	.00	.04	-.11	.00	.18	.03	-.03	.17	.06	.09	270
271	-.01	-.05	-.01	-.02	-.03	.08	-.09	.04	-.08	.03	.05	.11	-.05	.08	-.03	.01	271
272	-.13	-.09	.07	-.02	.01	.06	-.04	-.01	-.09	-.00	.14	.03	-.09	.10	.17	.13	272
273	-.18	-.07	.05	-.08	-.00	-.00	-.01	-.04	-.09	-.04	.17	-.01	.01	.20	.17	.15	273
277	.08	-.04	.16	.09	.23	.06	.00	.14	-.11	.01	-.14	.26	-.07	-.05	.06	-.04	277
278	.12	.45	-.42	-.07	-.20	-.36	.09	-.19	.48	.25	-.25	-.01	.38	-.02	-.03	-.43	278
280	.10	.19	-.18	-.11	-.08	-.09	.05	-.10	.28	.17	.01	.05	.18	.04	.02	-.18	280
282	.07	.17	-.31	-.17	-.13	-.17	-.04	-.06	.26	.19	-.02	-.05	.18	.00	-.03	-.20	282
283	.15	.42	-.41	-.07	-.13	-.33	.10	-.15	.40	.14	-.25	.04	.33	-.00	.00	-.42	283
284	.14	.45	-.44	-.11	-.27	-.40	.11	-.24	.54	.25	-.25	-.09	.40	-.02	-.00	-.41	284

	246	250	252	254	256	259	262	265	270	271	272	273	277	278	280	282	283	284	
246	1.00																		
250	-.15	1.00																	
252	-.34	.12	1.00																
254	-.09	.01	.13	1.00															
256	-.02	-.02	.03	.32	1.00														
259	.04	-.01	.14	.03	.07	1.00													
262	.12	.04	-.08	.23	.30	-.05	1.00												
265	-.04	.10	.17	.04	.16	.12	.03	1.00											
270	-.06	.11	.10	.27	.32	.05	.14	.16	1.00										
271	.04	.05	.02	.04	-.05	.13	-.07	.05	-.03	1.00									
272	-.07	.01	.04	.12	.34	.13	.12	.17	.24	.01	1.00								
273	-.11	-.03	.16	.19	.36	.08	.24	.24	.43	.02	.33	1.00							
277	.01	-.02	.14	.04	-.10	.09	-.01	.15	-.16	.04	.00	.00	1.00						
278	.38	-.05	-.67	-.15	-.07	-.06	.07	-.18	-.05	-.02	-.11	-.12	-.24	1.00					
280	.18	-.01	-.47	-.03	-.04	-.14	.00	-.09	-.09	-.05	-.01	-.12	-.17	.26	1.00				
282	.14	-.06	-.39	-.04	-.07	-.14	-.01	-.15	-.01	-.10	-.02	-.11	-.21	.38	.57	1.00			
283	.31	.01	-.55	-.10	-.09	-.06	.06	-.06	-.08	.04	-.13	-.18	.02	.72	.25	.26	1.00		
284	.36	-.02	-.63	-.14	-.09	-.06	.05	-.17	-.07	-.01	-.10	-.15	-.28	.93	.35	.47	.78	1.00	

App. 6. Varimax solution of 15 dimensions

Liite 6. Varimax-ratkaisu dimensioluville 15

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	h^2_{15}	
6	.01	.01	-.03	.04	.12	.01	.07	-.16	-.06	.24	.29	-.08	.03	.08	-.03	.20	6
7	.03	.42	.07	.08	.01	.07	.01	.11	.11	.02	.00	.09	-.06	.01	-.15	.25	7
10	.16	-.21	.00	-.02	-.02	.11	.05	.05	.02	-.08	-.02	.09	-.00	-.03	.05	.11	10
13	.01	-.22	-.04	.06	.02	-.00	.07	-.10	-.05	.08	-.26	-.17	-.09	-.10	.04	.19	13
14	-.10	-.01	.13	-.02	.07	.02	-.05	-.00	.02	-.40	-.01	-.03	-.05	-.05	.08	.20	14
19	.02	.08	.13	-.00	.01	-.02	.07	.07	.00	.01	-.39	-.03	.00	.05	.02	.19	19
20	.03	-.11	-.01	.11	.02	.03	-.11	-.01	-.02	-.18	.30	.05	.05	.12	-.05	.18	20
23	.23	-.16	.08	.01	.16	-.15	.12	.04	.06	-.01	.02	-.09	-.11	-.05	-.07	.18	23
24	-.12	.37	-.00	-.05	-.07	-.02	.06	-.07	-.05	-.02	.02	.07	-.03	.14	-.10	.21	24
25	.04	.04	.01	.03	.02	-.04	-.02	-.06	.04	.01	-.09	.01	-.03	.08	-.45	.23	25
26	-.03	-.36	-.08	-.03	-.17	.01	-.20	.07	.09	-.03	.23	-.10	-.07	.04	-.03	.29	26
27	-.00	-.10	.12	.10	.18	.07	.09	.11	-.00	.07	-.01	-.06	.22	-.22	.24	.25	27
28	.11	.06	-.06	-.06	.02	-.02	.06	-.06	-.07	-.04	-.14	.08	-.11	-.03	.39	.23	28
29	-.07	-.19	.02	.00	.02	.04	.03	.13	.02	.03	.22	.00	-.31	-.04	.05	.21	29
30	.13	-.19	-.07	-.06	.12	-.03	.08	-.06	-.05	-.07	.10	-.09	.05	-.23	-.28	.24	30
31	-.12	-.00	-.03	-.08	-.15	-.11	.01	-.14	-.03	.00	-.08	-.04	-.23	.06	.31	.24	31
32	.00	.12	.04	.19	.06	-.01	.04	.12	-.02	-.02	.06	.16	.49	.14	-.01	.37	32
33	.06	.18	.03	-.08	-.05	.10	-.16	-.06	.09	.05	-.27	-.06	-.12	.04	-.07	.19	33
34	.02	.12	-.06	-.05	-.01	-.09	.01	.07	.10	-.02	.27	-.03	.04	-.07	.15	.15	34
35	.03	.21	.07	.06	.01	-.01	.09	.03	-.02	.00	.10	-.07	.04	.06	.23	.13	35
36	.07	.08	.22	.11	.33	-.03	-.08	-.05	.21	.23	.17	-.02	.08	-.08	.01	.33	36
37	.11	.05	.01	-.08	.38	.02	.02	.04	-.07	-.01	.03	.00	-.02	-.10	.03	.19	37
38	-.17	.06	-.11	-.21	-.37	-.14	.01	.00	-.03	.17	-.19	.11	.03	.06	.20	.37	38
40	.01	-.21	-.08	.11	-.15	.13	.13	.01	-.12	-.31	.09	-.10	.01	.06	-.23	.31	40
41	-.04	.06	-.17	-.00	.38	-.09	-.02	-.10	-.20	.01	-.05	-.01	.04	.12	-.01	.25	41
42	.10	-.06	.12	.05	.09	-.02	-.31	-.00	.08	-.09	-.07	-.01	.06	-.05	.01	.16	42
43	-.21	-.06	-.04	-.07	.26	.11	.08	-.06	-.21	.12	-.11	.03	-.02	-.01	-.15	.24	43
44	.05	.05	-.00	.11	.11	-.06	.11	.03	.07	-.07	-.03	-.07	-.29	.19	.09	.19	44
45	-.04	-.01	-.00	.09	-.21	.04	-.29	-.04	.11	.07	-.02	.05	.09	.05	.02	.17	45
46	.07	-.11	.06	-.08	-.39	-.11	-.05	.24	.08	-.03	.18	-.05	-.04	.05	-.02	.30	46
47	.05	.09	.08	-.03	-.22	.14	.32	-.05	.11	-.03	.08	.07	.13	-.29	.06	.32	47
48	.00	.16	-.02	.15	-.07	-.05	.04	-.06	-.00	.00	.05	.03	.08	.18	-.12	.12	48
49	.02	.17	-.13	.01	.17	.14	-.08	-.19	.07	.01	-.04	.00	-.11	.00	.11	.17	49
50	-.04	-.08	-.05	-.09	.01	.04	-.14	-.14	.01	.20	-.08	.13	-.02	-.04	.14	.14	50
51	-.02	-.20	.05	.05	-.10	-.37	-.13	.06	-.13	-.03	.11	-.05	.04	-.02	-.07	.25	51
55	.01	-.09	.02	-.05	.02	.20	.25	.27	.09	-.04	.00	-.06	.04	-.06	.02	.21	55
56	-.09	-.08	.08	.11	.13	.03	-.15	.05	-.50	-.10	.06	.05	-.03	-.03	.01	.35	56
57	-.02	.15	.11	-.21	.15	.06	-.00	.00	.12	-.06	.07	.07	-.04	.07	.08	.15	57
58	-.08	-.06	.01	-.03	-.09	.12	-.07	-.04	.34	.03	.08	-.01	-.10	-.06	-.07	.18	58
59	.02	.04	.03	.17	-.03	-.13	.13	.13	.03	.23	-.06	-.01	-.09	.24	-.16	.23	59
60	.20	.05	-.13	.16	-.03	-.32	-.01	-.01	.01	.02	-.01	.03	-.08	-.20	-.03	.24	60
61	-.00	-.07	-.10	-.16	-.14	.19	.12	-.09	.05	-.06	-.14	-.11	.30	.00	.13	.26	61
62	.02	.19	.13	-.10	.06	.18	.16	.03	-.47	.23	.01	.10	-.06	.12	.04	.42	62
63	-.10	-.17	-.06	-.05	-.05	.23	-.24	.04	.27	-.15	-.02	-.17	.07	.37	-.06	.43	63
64	.11	.12	-.14	.08	-.03	-.40	.06	-.10	.24	-.07	.02	.04	-.00	.09	.04	.30	64
65	-.01	-.13	.02	.10	.01	-.13	.02	-.00	.07	-.05	-.01	.02	-.00	-.59	-.02	.40	65
66	.23	.12	-.08	.06	.31	-.13	.05	.13	.02	-.19	.05	.03	.00	.13	.02	.27	66
67	-.16	-.09	.06	-.13	-.00	-.53	-.02	-.05	-.08	.18	-.03	-.09	.02	-.07	-.03	.39	67
68	.23	-.14	.16	-.02	-.16	.25	-.15	-.05	-.04	-.33	-.11	-.00	.09	.04	-.03	.35	68
69	-.27	.11	-.14	.09	-.12	.40	.12	-.03	.09	.29	.10	.09	-.11	-.06	.03	.43	69

App. 6 (cont.). Varimax solution of 15 dimensions

Liite 6 (jathoa). Varimax-ratkaisu dimensioluuvulla 15

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	h^2_{15}
70	-.29	.03	-.21	-.05	.01	.06	-.05	-.10	-.28	-.03	.06	-.07	-.04	-.02	.12	.25
73	-.26	-.01	-.04	.02	.01	-.32	-.03	.07	.19	-.04	-.07	-.02	-.14	.08	.07	.25
79	.04	-.21	-.27	-.16	-.20	.10	-.06	.05	-.08	.18	.01	-.12	-.01	-.10	.08	.27
83	-.19	.07	.41	.10	-.07	.04	-.04	-.17	-.07	-.10	-.09	.01	-.00	-.10	.02	.29
86	-.17	.14	-.12	.00	.12	.11	-.10	-.03	.07	.09	.07	-.26	.42	-.09	.06	.38
87	.25	-.07	-.02	.12	-.05	.10	-.04	.02	.01	.01	.25	.16	-.22	-.09	-.08	.25
88	-.06	.07	.04	.05	.11	.05	-.05	.02	-.00	-.04	-.22	.06	-.33	.03	.13	.21
89	.17	-.12	.19	.03	-.13	-.12	.09	-.02	-.01	-.09	-.02	.10	-.04	.22	.19	.22
90	-.16	-.05	-.06	-.19	-.07	-.18	.13	.01	-.08	.01	-.14	.02	.05	-.03	-.30	.24
91	.18	-.46	-.19	-.18	.10	-.12	-.10	.00	.06	.23	.11	-.14	.13	.09	-.15	.48
92	.04	-.01	.28	-.10	-.07	.11	-.05	-.02	-.09	-.00	.33	-.06	-.25	.12	.03	.31
93	-.21	.27	-.04	.21	-.22	.00	-.26	-.05	-.08	-.09	.03	.05	.08	-.24	.24	.42
94	.15	.03	-.07	.08	.09	-.04	-.25	.10	.04	-.12	-.35	.23	-.04	.05	-.15	.33
95	-.11	.12	.04	-.03	.10	.04	.58	-.03	.05	-.02	-.11	-.06	.04	.02	.01	.40
96	.01	.07	-.04	.02	.12	.07	.02	.01	.09	.07	-.08	-.05	.01	-.18	.09	.09
101	.14	-.11	-.03	.15	.14	.08	-.13	.23	.28	-.02	-.15	.01	-.02	.03	.04	.26
116	.07	-.35	.07	.09	-.04	.04	-.41	.09	-.00	-.12	.19	-.10	-.10	.05	-.17	.42
201	.67	-.16	-.10	-.07	.07	-.04	.02	.09	.18	.01	.07	.05	.06	.16	-.02	.57
203	-.44	.22	.19	.01	-.07	-.01	-.05	.10	.13	-.31	-.03	.26	-.08	-.08	-.18	.52
205	-.05	.09	.04	.01	-.03	.02	.02	.06	.14	-.17	.05	.18	-.18	-.05	-.03	.13
206	-.08	-.02	.56	-.04	.01	.02	.07	.04	.02	-.12	-.05	.07	-.04	-.04	-.11	.37
207	-.29	.07	.11	.05	-.00	-.04	.05	-.62	.18	-.09	.06	.03	-.02	.03	.05	.54
209	.08	.03	-.01	-.01	-.05	-.05	-.05	.58	-.03	-.02	.01	.04	-.04	.06	.09	.37
211	-.17	-.02	.27	.04	.05	-.00	-.15	.00	-.02	.09	-.15	.03	.13	.12	.07	.20
212	.47	-.04	-.11	-.03	-.10	-.03	-.07	.61	-.00	-.03	.02	-.13	-.02	-.05	.02	.64
213	.20	-.02	-.21	-.03	.11	.02	-.07	-.19	-.12	-.20	-.02	-.15	-.06	.06	-.16	.25
222	-.45	.08	-.05	-.01	-.06	-.03	.09	-.30	-.14	.32	-.00	-.23	.03	-.09	.13	.51
223	.02	.04	.61	-.00	-.05	.03	.01	-.03	-.02	.00	.04	-.10	-.07	-.03	.09	.40
224	.59	-.07	-.17	-.04	.12	-.08	.08	.08	.05	.03	.03	.06	.13	.13	.06	.46
228	-.06	.30	-.08	-.18	-.02	.09	.11	-.02	-.09	-.07	-.08	-.09	.01	-.04	.03	.18
238	.09	.01	-.06	-.43	-.08	-.03	.06	.05	.01	-.07	.08	.07	.03	-.02	-.07	.23
241	-.64	.23	-.13	-.04	-.11	.03	-.01	.02	-.12	-.07	-.05	.01	-.02	-.05	-.05	.52
246	.56	-.03	.03	-.06	.05	-.08	-.06	.05	.13	-.25	.06	.03	.01	.10	.01	.43
250	-.13	-.00	-.03	-.05	-.05	.07	-.04	.06	-.01	.21	-.15	-.01	.04	-.07	-.02	.11
252	-.58	-.04	-.03	-.10	.09	-.07	.02	-.08	.11	.16	.05	.44	-.02	.13	.03	.62
254	-.14	.41	.06	-.12	.08	-.09	.02	-.08	.08	.14	.08	-.03	.06	-.07	.02	.27
256	-.10	.50	-.08	-.32	.09	.01	.05	-.04	-.05	.02	-.04	-.04	-.00	-.01	.10	.40
259	.06	-.02	.03	-.18	.06	-.09	-.04	-.25	-.01	.00	.02	.22	-.04	-.09	.03	.16
262	.10	.38	.03	-.08	.05	-.01	.06	.04	-.08	-.01	-.07	-.01	.17	.06	.05	.21
265	-.06	.08	.08	-.39	-.11	.08	-.03	-.01	.05	.11	-.02	.12	-.01	.12	-.06	.24
270	-.10	.31	-.05	-.40	.21	.13	-.00	.01	.02	.16	-.04	-.03	-.01	-.03	.09	.36
271	.03	.04	.04	-.06	-.16	-.01	-.10	-.25	-.12	.00	.13	.05	-.01	-.00	.04	.14
272	-.10	.09	.03	-.50	.02	.03	.06	-.08	.04	.01	-.12	-.08	-.06	-.07	.13	.33
273	-.11	.31	-.01	-.51	.11	-.04	.10	-.01	-.16	.03	.02	.05	.01	.11	-.06	.44
277	-.03	-.06	.45	-.05	-.03	-.01	-.12	-.06	-.08	-.03	-.04	.25	.03	.15	-.07	.32
278	.80	.03	-.17	.12	-.02	.06	-.07	.08	-.19	.04	-.10	-.26	-.13	-.20	-.07	.87
280	.25	-.00	-.02	.03	-.00	-.12	.01	.08	.09	-.06	.04	-.64	-.04	.06	.01	.52
282	.29	-.02	-.11	.10	.05	-.03	.06	.07	.09	.00	-.03	-.61	.01	-.01	-.07	.51
283	.72	-.03	-.03	.08	-.06	.10	-.18	.05	-.15	.10	-.10	-.20	.02	-.13	-.02	.68
284	.78	-.01	-.28	.11	-.01	.04	-.11	.13	-.14	.06	-.08	-.32	-.11	-.21	-.03	.92

App. 7. Varimax solution of 6 dimensions

Liite 7. Varimax-ratkaisu dimensioluulla 6

	1	2	3	4	5	6	h^2_6
6	.01	-.00	-.11	.00	.29	.05	.10
7	-.02	.29	.12	.02	-.14	-.20	.16
10	.17	-.12	.05	-.04	-.09	.05	.06
13	.06	-.07	-.11	.16	.10	.15	.08
14	-.04	-.02	.24	.05	-.06	-.05	.07
19	.02	.18	.06	.00	-.08	-.05	.05
20	.06	-.24	.11	-.02	.03	-.08	.08
23	.27	-.08	-.04	.02	.11	-.14	.12
24	-.17	.26	.07	-.13	.01	-.07	.12
25	.05	-.07	.03	-.07	.11	-.14	.05
26	.01	-.47	-.10	-.05	-.11	.13	.26
27	.02	.07	.00	.25	.01	.02	.07
28	.07	.22	-.01	-.01	-.05	.08	.06
29	-.01	-.19	.03	-.03	-.04	.06	.04
30	.19	-.14	-.09	.06	.19	.04	.11
31	-.16	.04	-.03	-.05	-.02	.14	.05
32	-.04	.07	.05	.05	-.04	-.26	.08
33	.04	.16	.04	-.03	-.09	.05	.04
34	-.02	.06	-.11	.02	-.08	-.08	.03
35	-.00	.21	.03	.08	-.05	-.04	.06
36	.06	.06	.06	.14	.23	-.22	.13
37	.17	.18	.00	-.00	.19	-.06	.10
38	-.29	.07	-.17	-.20	-.20	.17	.23
40	.09	-.25	.06	.04	-.06	.09	.09
41	.03	.14	-.11	-.05	.34	-.09	.16
42	.13	-.11	.13	.08	-.02	-.07	.06
43	-.12	.08	-.01	-.07	.29	.12	.13
44	.08	.06	.02	-.00	.01	-.17	.04
45	-.09	-.16	.03	.04	-.15	.03	.06
46	.04	-.25	-.04	-.12	-.35	.03	.20
47	-.05	.17	.06	.12	-.15	.11	.08
48	-.04	.04	.02	-.00	.03	-.14	.02
49	.00	.19	-.02	.05	.11	.01	.05
50	-.08	-.02	-.04	-.07	.08	.14	.04
51	.02	-.31	-.04	.02	.05	-.06	.11
55	.05	.05	-.05	.01	-.20	.03	.05
56	.04	-.07	.22	.06	.16	.19	.12
57	-.03	.18	.11	-.19	.01	-.08	.09
58	-.11	-.15	-.00	.00	-.10	-.02	.04
59	.01	-.02	-.08	-.04	.00	-.20	.05
60	.14	-.02	-.15	.19	.02	-.18	.11
61	-.04	.07	-.13	-.02	-.09	.21	.07
62	.05	.33	.15	-.18	.13	.27	.25
63	-.04	-.27	-.01	-.15	-.16	-.02	.13
64	.01	.00	-.18	-.00	.02	-.38	.18
65	-.03	-.09	-.01	.36	-.00	.02	.14
66	.27	.13	-.03	-.03	.04	-.34	.21
67	-.16	-.10	-.19	-.06	.23	-.07	.13
68	.26	-.13	.30	-.01	-.18	.15	.24
69	-.33	.11	-.06	.08	-.08	.23	.19

App. 7 (cont.). Varimax solution of 6 dimensions

Liite 7 (jatkoa). Varimax-ratkaisu dimensioluvulla 6

	1	2	3	4	5	6	h^2_6
70	-.23	.05	-.09	.02	.12	.27	.15
73	-.27	-.10	-.11	-.03	-.04	-.25	.16
79	.04	-.13	-.32	-.03	-.11	-.35	.26
83	-.18	.04	.43	.15	.06	.07	.25
86	-.16	.13	-.22	.21	.06	.06	.14
87	-.23	-.15	.10	.02	-.05	.01	.09
88	-.04	.12	.14	.01	-.03	-.02	.04
89	.14	-.09	.17	-.13	-.07	-.07	.08
90	-.15	-.04	-.12	-.18	.08	-.00	.08
91	.23	-.40	-.38	-.18	.19	.05	.43
92	.08	-.08	.27	-.14	.01	.17	.13
93	-.28	.11	.11	.33	-.19	.10	.25
94	.15	-.01	.08	-.05	-.11	-.23	.10
95	-.13	.32	-.05	.00	.09	-.09	.14
96	-.00	.15	-.08	.16	-.00	.01	.05
101	.15	-.11	-.04	.10	-.20	-.22	.14
116	.18	-.52	.12	.03	-.05	.06	.32
201	.62	-.11	-.18	-.17	-.07	-.20	.51
203	-.45	.03	.36	-.05	-.18	-.21	.41
205	-.08	.02	.16	-.04	-.14	-.14	.07
206	-.04	-.00	.49	-.05	-.01	-.06	.25
207	-.36	.01	.19	.07	.37	-.01	.31
209	.11	.00	-.07	-.09	-.43	-.14	.23
211	-.15	-.01	.20	-.00	.04	-.02	.07
212	.50	-.04	-.23	.00	-.49	-.07	.56
213	.26	-.03	-.08	-.01	.18	.05	.11
222	-.46	.13	-.17	.17	.29	.31	.47
223	.05	.06	.46	.06	.00	.07	.22
224	.54	.03	-.23	-.13	-.01	-.18	.40
228	-.07	.35	-.05	-.05	-.04	.12	.15
238	.07	.05	-.10	-.36	-.07	.08	.16
241	-.62	.13	-.01	.00	-.05	.12	.42
246	.54	-.04	.05	-.11	-.11	-.22	.37
250	-.14	.04	-.10	.01	-.05	.12	.05
252	-.63	-.08	.05	-.30	.16	-.13	.54
254	-.21	.35	-.04	-.01	.10	-.08	.18
256	-.15	.54	-.09	-.17	.01	.05	.35
259	.01	.01	.09	-.20	.19	.00	.09
262	.06	.40	.00	-.05	-.04	-.08	.17
265	-.11	.10	.03	-.39	-.07	.12	.20
270	-.10	.43	-.12	-.23	.06	.10	.28
271	-.01	-.02	.10	-.05	.09	.18	.05
272	-.11	.26	-.06	-.27	.01	.21	.20
273	-.11	.38	-.05	-.45	.12	.08	.38
277	-.02	-.09	.46	-.21	.06	-.04	.27
278	.82	.11	-.19	.26	-.10	.14	.81
280	.33	-.02	-.26	.22	-.05	-.00	.23
282	.36	.01	-.33	.29	-.01	.01	.33
283	.72	.04	-.09	.19	-.11	.17	.61
284	.80	.06	-.33	.28	-.14	.14	.88

App. 8. Analytic cosine solution I with 6 dimensions

Liite 8. Analyttinen kosiniratkaisu I dimensioluvulla 6

	1	2	3	4	5	6	h^2_6
6	.00	-.09	.03	-.12	-.24	.07	.10
7	.22	-.13	-.32	.13	.29	.09	.16
10	-.05	.20	.05	-.08	.02	.02	.06
13	-.05	.05	.13	.05	-.21	.16	.08
14	-.05	.16	-.14	.10	-.02	-.08	.07
19	.17	-.05	-.14	.08	.16	.06	.05
20	-.25	.20	-.03	-.12	-.13	-.09	.08
23	-.08	.09	-.15	-.22	-.06	.22	.12
24	.24	-.22	-.13	.05	.17	-.12	.12
25	-.09	.01	-.11	-.17	-.06	-.02	.05
26	-.42	.24	.38	-.12	-.14	-.21	.26
27	.02	.02	-.09	.19	-.08	.22	.07
28	.27	-.05	-.03	.07	.13	.12	.06
29	-.16	.14	.14	-.03	-.07	-.13	.04
30	-.11	.10	.04	-.16	-.23	.17	.11
31	.07	-.07	.16	.09	-.00	-.14	.05
32	-.04	-.10	-.25	.02	.12	.04	.08
33	.20	-.01	-.04	.06	.14	.04	.04
34	.02	-.13	-.02	.03	.14	.05	.03
35	.18	-.08	-.15	.13	.12	.13	.06
36	-.04	-.04	-.32	-.04	-.16	.20	.13
37	.20	-.05	-.21	-.11	-.03	.23	.10
38	.12	-.25	.34	.09	.25	-.31	.23
40	-.21	.27	.13	-.03	-.13	-.05	.09
41	.12	-.22	-.14	-.18	-.15	.13	.16
42	-.13	.21	-.12	-.02	-.07	.07	.06
43	.11	-.11	.06	-.05	-.23	-.07	.13
44	.02	-.04	-.18	-.06	.08	.09	.04
45	-.18	.10	.12	.09	.01	-.14	.06
46	-.20	.16	.23	-.04	.23	-.19	.20
47	.17	.00	-.01	.26	.11	.07	.08
48	-.02	-.08	-.13	-.02	.04	.00	.02
49	.19	-.12	-.10	.05	-.02	.13	.05
50	.03	-.03	.16	-.01	-.10	-.10	.04
51	-.35	.12	.09	-.13	-.18	-.08	.11
55	.07	.00	.05	.07	.20	.04	.05
56	.00	.27	.01	.04	-.30	-.02	.12
57	.21	-.10	-.14	-.08	.16	-.10	.09
58	-.18	.03	.10	.04	.01	-.15	.04
59	-.09	-.12	-.10	-.11	.09	.01	.05
60	-.11	-.06	-.14	-.02	.01	.29	.11
61	.14	-.07	.22	.09	.08	-.00	.07
62	.50	.00	.00	.00	.00	-.00	.25
63	-.25	.10	.19	-.12	.07	-.26	.13
64	-.15	-.26	-.22	-.15	.15	.10	.18
65	-.19	.10	-.02	.24	-.20	.19	.14
66	.07	-.09	-.37	-.22	.19	.27	.21
67	-.17	-.22	.09	-.14	-.17	-.11	.13
68	.00	.49	-.00	.00	.00	.00	.24
69	.09	-.16	.24	.31	-.00	-.16	.19

App. 8 (cont.). Analytic cosine solution I with 6 dimensions

Liite 8 (jatkoa). Analyyttinen kosiniratkaisu I dimensioluvulla 6

	1	2	3	4	5	6	h_6^2
70	.08	-.12	.27	.14	-.18	-.13	.15
73	-.26	-.24	-.01	-.00	.07	-.21	.16
79	-.00	-.00	.51	.00	.00	-.00	.26
83	.01	.24	-.18	.27	-.23	-.13	.25
86	.06	-.25	.07	.21	-.06	.15	.14
87	-.10	.27	-.03	-.09	-.04	.09	.09
88	.11	.01	-.13	.09	.06	-.02	.04
89	-.04	.19	-.09	-.14	.07	-.08	.08
90	-.03	-.18	.14	-.12	-.00	-.20	.08
91	-.31	.02	.35	-.47	-.20	.02	.43
92	.06	.30	.04	-.07	-.10	-.16	.13
93	.00	.00	.00	.50	-.00	.00	.25
94	-.05	.06	-.21	-.12	.18	.05	.10
95	.26	-.31	-.17	.09	.11	.07	.14
96	.11	-.10	-.06	.14	.03	.19	.05
101	-.18	.07	-.14	-.02	.18	.14	.14
116	-.47	.48	.16	-.16	-.25	-.11	.32
201	.00	.15	-.13	-.49	.25	.36	.51
203	-.12	-.04	-.19	.24	.14	-.47	.41
205	-.03	.03	-.13	.05	.15	-.14	.07
206	.00	.30	-.26	.05	-.07	-.21	.25
207	-.09	-.08	-.10	.10	-.42	-.22	.31
209	-.00	-.00	-.00	.00	.48	.00	.23
211	-.05	.06	-.08	.07	-.09	-.17	.07
212	.04	.15	.04	-.11	.53	.36	.56
213	.05	.08	-.01	-.19	-.14	.22	.11
222	.08	-.31	.29	.30	-.36	-.11	.47
223	.10	.35	-.22	.14	-.12	-.04	.22
224	.12	.00	-.15	-.41	.24	.40	.40
228	.40	-.22	.00	.14	.19	.06	.15
238	.19	-.09	.18	-.24	.23	-.17	.16
241	.03	-.33	.21	.36	.01	-.42	.42
246	.04	.23	-.27	-.34	.24	.30	.37
250	.05	-.10	.17	.11	.03	-.07	.05
252	-.20	-.35	.11	-.04	-.08	-.69	.54
254	.28	-.35	-.16	.12	.11	.01	.18
256	.58	-.44	-.07	.10	.31	.02	.35
259	.07	-.00	-.03	-.20	-.10	-.13	.09
262	.40	-.21	-.23	.05	.28	.18	.17
265	.23	-.10	.17	-.14	.21	-.34	.20
270	.51	-.37	.03	-.00	.23	-.02	.28
271	.06	.12	.09	-.00	-.15	-.08	.05
272	.39	-.21	.18	-.03	.16	-.16	.20
273	.51	-.36	.04	-.19	.24	-.21	.38
277	-.04	.30	-.17	-.12	-.11	-.32	.27
278	.28	.31	-.09	-.10	.11	.86	.81
280	-.02	.03	.00	-.03	.03	.46	.23
282	.00	-.00	.00	-.00	.00	.57	.33
283	.22	.38	-.05	-.10	.07	.67	.61
284	.21	.24	-.00	-.10	.14	.88	.88

App. 9. Analytic cosine solution III with 6 dimensions

Liite 9. Analyttinen kosinivarkaisu III dimensiluvulla 6

	1	2	3	4	5	6	h_6^2
6	-.13	.05	-.12	-.24	-.08	-.01	.10
7	-.04	-.31	.12	.19	-.10	.20	.16
10	.15	.06	-.08	.04	-.02	-.05	.06
13	-.09	.16	.04	-.19	-.16	-.09	.08
14	.19	-.15	.10	-.00	.08	-.02	.07
19	.02	-.14	.07	.09	-.08	.15	.05
20	.09	-.03	-.12	-.02	.10	-.23	.08
23	-.12	-.11	-.23	-.02	-.23	-.15	.12
24	.03	-.16	.05	.05	.11	.28	.12
25	-.04	-.11	-.17	-.02	.03	-.08	.05
26	.10	.36	-.11	.05	.25	-.37	.26
27	-.11	-.05	.18	-.09	-.23	-.04	.07
28	.05	-.02	.06	.01	-.14	.24	.06
29	.12	.12	-.03	.00	.15	-.13	.04
30	-.09	.08	-.17	-.18	-.18	-.16	.11
31	.08	.13	.10	-.04	.14	.11	.05
32	-.16	-.24	-.02	.14	-.04	-.05	.08
33	.10	-.04	.06	.05	-.05	.19	.04
34	-.15	-.01	-.02	.13	-.05	.00	.03
35	-.05	-.14	.12	.04	-.14	.15	.06
36	-.21	-.28	-.05	-.14	-.21	-.10	.13
37	-.08	-.18	-.12	-.12	-.25	.14	.10
38	.05	.28	.11	.19	.32	.21	.23
40	.15	.13	-.02	-.03	.06	-.20	.09
41	-.23	-.12	-.19	-.20	-.15	.08	.16
42	.06	-.10	-.03	-.00	-.07	-.15	.06
43	.02	.04	-.04	-.29	.07	.14	.13
44	-.09	-.17	-.07	.08	-.09	-.01	.04
45	.07	.10	.10	.09	.15	-.14	.06
46	.15	.21	-.03	.32	.21	-.15	.20
47	.07	-.00	-.25	.03	-.08	.15	.08
48	-.10	-.13	-.02	.05	.00	-.02	.02
49	-.08	-.08	.04	-.11	-.15	.15	.05
50	.06	.14	-.01	-.11	.10	.06	.04
51	-.07	.09	-.12	-.02	.10	-.33	.11
55	.02	.06	.07	.17	-.05	.06	.05
56	.28	.01	.04	-.30	.02	.01	.12
57	.12	-.17	-.07	.06	.10	.24	.09
58	.01	.08	.05	.09	.17	-.14	.04
59	-.19	-.09	-.11	.13	-.01	-.09	.05
60	-.34	-.09	-.04	.06	-.30	-.20	.11
61	.03	.22	.09	.01	-.00	.15	.07
62	.35	-.02	.00	-.23	-.03	.51	.25
63	.11	.15	-.10	.19	.29	-.18	.13
64	-.43	-.19	-.16	.22	-.09	-.18	.18
65	-.17	.02	.23	-.10	-.20	-.25	.14
66	-.23	-.33	-.23	.16	-.29	-.01	.21
67	-.26	.08	-.13	-.10	.12	-.14	.13
68	.49	-.00	.00	.00	-.00	.00	.24
69	.02	.21	.32	-.05	.17	.14	.19

App. 9 (cont.). Analytic cosine solution III with 6 dimensions

Liite 9 (jatkoa). Analyttinen kosiniratkaisu III dimensioluvulla 6

	1	2	3	4	5	6	h^2_6
70	.03	.24	.15	-.22	.13	.12	.15
73	-.27	-.04	.01	.19	.23	-.20	.16
79	.00	.51	.00	.00	.00	.00	.26
83	.34	-.20	.28	-.24	.14	.05	.25
86	-.32	.10	.20	-.08	-.16	.01	.14
87	.14	-.01	-.10	.01	-.09	-.13	.09
88	.10	-.13	.09	.00	.01	.12	.04
89	.22	-.10	-.14	.08	.08	-.02	.08
90	-.06	.11	-.11	.01	.21	.03	.08
91	-.21	.37	-.47	-.06	-.01	-.32	.43
92	.46	.01	-.06	-.13	.17	.10	.13
93	.00	-.00	.50	.00	.00	.00	.25
94	-.01	-.20	-.12	.20	-.05	-.06	.10
95	-.18	-.16	.08	-.01	-.09	.24	.14
96	-.16	-.03	.13	-.02	-.21	.05	.05
101	-.16	-.10	-.03	.27	-.14	-.23	.14
116	.23	.16	-.15	-.04	.14	-.44	.32
201	-.10	-.06	-.51	.25	-.38	-.10	.51
203	.21	-.27	.27	.19	.50	.01	.41
205	.10	-.16	.06	.16	.14	.01	.07
206	.44	-.30	.07	-.07	.22	.06	.25
207	.01	-.14	.11	-.38	.24	-.03	.31
209	-.00	-.00	-.00	.48	-.00	-.00	.23
211	.15	-.11	.08	-.07	.18	.00	.07
212	-.08	.10	-.13	.51	-.38	-.06	.56
213	-.04	.03	-.21	-.16	-.23	-.01	.11
222	-.18	.27	.31	-.40	.11	.12	.47
223	.45	-.23	.14	-.17	.04	.11	.22
224	-.20	-.08	-.43	.19	-.43	-.00	.40
228	.01	-.00	.13	.01	-.08	.38	.15
238	.16	.14	-.22	.14	.16	.24	.16
241	-.02	.13	.38	-.01	.44	.15	.42
246	.05	-.22	-.36	.23	-.32	-.05	.37
250	-.02	.16	.12	.00	.07	.07	.05
252	-.00	.00	-.00	.00	.73	-.00	.54
254	-.17	-.17	.12	-.02	-.03	.28	.18
256	-.05	-.09	.10	.05	-.05	.58	.35
259	.14	-.06	-.19	-.13	.13	.11	.09
262	-.05	-.22	.04	.09	-.21	.36	.17
265	.30	.10	-.12	.09	.35	.33	.20
270	.00	-.00	-.00	-.00	.00	.52	.28
271	.22	.08	.00	-.18	.09	.09	.05
272	.17	.13	-.02	-.02	.15	.44	.20
273	.15	-.02	-.17	.00	.20	.58	.38
277	.50	-.22	-.10	-.09	.34	.06	.27
278	-.10	.04	-.15	-.00	-.91	.03	.81
280	-.30	.08	-.05	.05	-.48	-.15	.23
282	-.40	.10	-.03	.01	-.60	-.17	.33
283	.05	.06	-.14	-.02	-.72	.02	.61
284	-.22	.14	-.16	.05	-.94	-.04	.88

App. 10. Correlations of the basic vectors in oblique solutions I and III

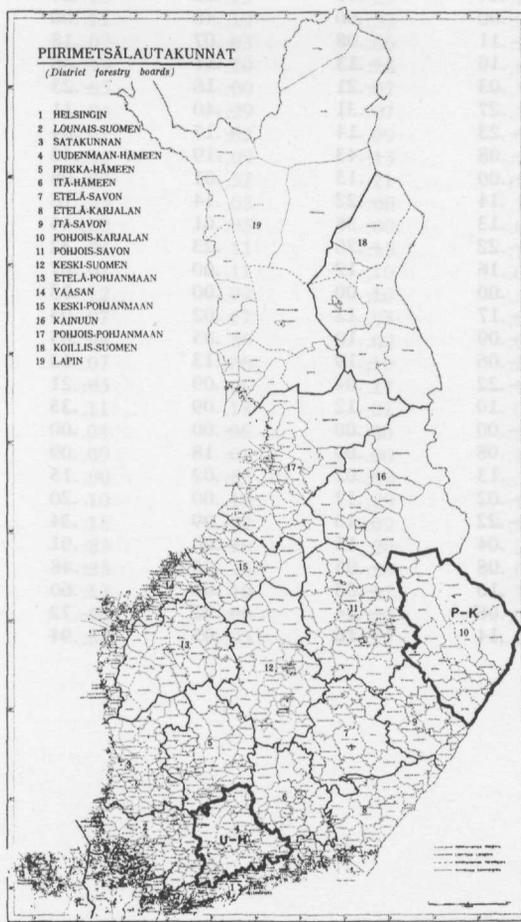
Liite 10. Kantavektorien korrelaatiot kosinivarkaisuissa I ja III

Oblique solution I, det. = .557

	62	68	79	93	209	282
62	1.00	.14	-.01	-.08	-.34	-.27
68	.14	1.00	.03	-.04	.29	-.02
79	-.01	.03	1.00	-.07	.12	.39
93	-.08	-.04	-.07	1.00	.01	-.13
209	-.34	.29	.12	.01	1.00	.15
282	-.27	-.02	.39	-.13	.15	1.00

Oblique solution III, det. = .476

	68	79	93	209	252	270
68	1.00	.03	-.04	.29	-.52	-.54
79	.03	1.00	-.07	.12	-.23	.05
93	-.04	-.07	1.00	.01	.09	-.05
209	.29	.12	.01	1.00	-.28	-.10
252	-.52	-.23	.09	-.28	1.00	.23
270	-.44	.05	-.05	-.10	.23	1.00

App. 11. Research areas
Liite 11. Tutkimusalueet

HAHTOLA, KAUKO

O.D.C. 644.5: 944

1973. The Rationale of Decision-Making by Forest Owners. — ACTA FORESTALIA FENNICA 130.000 p. Helsinki.

The study explores the mental and environmental factors affecting the normative and strategic decision-making of forest owners. Four value orientations — »preference for subsistence economy», »attachment to land», »resistance to change» and »traditionalism» — and six ecological types of farming — »problem farming», »extensive part-time farming», »prosperous field farming», »labour-intensive family farming», »part-time farming» and »commercial farming» — are defined by the aid of factor analysis. The decisions analyzed on the basis of these theoretical constructs concern management, cooperation and the promotion of private forestry. Some philosophical problems connected with the use of mental variables are also discussed.

Author's address: Forestry Department of the Work Efficiency Association (Työtehoseura), Melkonkatu 16 A, 00210 Helsinki 21, Finland.

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Time Factor and Investment Calculations in Timber Growing. Theoretical Fundamentals. Seloste: Aikatekijä ja investointilaskelmat puunkasvatuksessa. Teoreettisia perusteita.
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- VOL. 125, 1972. KUSTAA SEPPÄLÄ.
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- VOL. 129, 1973. JUHANI PÄIVÄNEN.
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KANNATAJAJÄSENET — UNDERSTÖDANDE MEDLEMMAR
CENTRALSKOGSNÄMNDEN SKOGSKULTUR
SUOMEN METSÄTEOLLISUUDEN KESKUSLIITTO
OSUUSKUNTA METSÄLIITTO
KESKUSOSUUSLIIKE HANKKIJA
SUNILA OSAKEYHTIÖ
OY WILH. SCHAUMAN AB
OY KAUKAS AB
KEMIRA OY
G. A. SERLACHIUS OY
KYMIN OSAKEYHTIÖ
SUOMALAISEN KIRJALLISUUDEN KIRJAPAINO
KESKUSMETSÄLAUTAKUNTA TAPIO
KOIVUKESKUS
A. AHLSTRÖM OSAKEYHTIÖ
TEOLLISUUDEN PAPERIPUUYHDISTYS R.Y.
OY TAMPELLA AB
JOUTSENO-PULP OSAKEYHTIÖ
TUKKIKESKUS
KEMI OY
MAATALOUSTUOTTAJAIN KESKUSLIITTO
VAKUUTUSOSAKEYHTIÖ POHJOLA
VEITSILUOTO OSAKEYHTIÖ
OSUUSPANKKIEN KESKUSPANKKI OY
SUOMEN SAHANOMISTAJAYHDISTYS
OY HACKMAN AB
YHTYNEET PAPERITEHTAAT OSAKEYHTIÖ
RAUMA-REPOLA OY
OY NOKIA AB, PUUNJALOSTUS