

Field Afforestation in Finland in the 1990s:

Objections, Preconditions & Alternatives



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METSÄNTUTKIMUSLAITOS
Kirjasto

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Finnish Forest Research Institute

Metsäntutkimuslaitoksen tiedonantoja 502
Finnish Forest Research Institute. Research Papers 502
Helsinki 1994



Selby, J.A. & Petäjistö, L. 1994. Field afforestation in Finland in the 1990s: objections, preconditions and alternatives. *Metsäntutkimuslaitoksen tiedonantoja* 502. The Finnish Forest Research Institute. Research Papers 502. 149 pages. ISBN 951-40-1367-0. ISSN 0358-4283.

The investigation addresses the future of field afforestation activities in Finland. Farmers' preconditions for and their objections to field afforestation, as well as their planned afforestation activities, are examined with respect to farm ownership, farm structure and farm management criteria. Special attention is given to the role of emotional factors concerning farming and the countryside and how these affect farmers' preconditions for and objections to field afforestation. The investigation also addresses aspects of the institutional environment for field afforestation by examining local agricultural, forestry and trade officials' attitudes towards policy solutions to agricultural over production and to field afforestation.

The empirical analysis reveals that impending ownership disturbance and planned cessation of agricultural are positively correlated with preconditions for field afforestation and planned afforestation. Objections to afforestation are logically related to continued use of agricultural means of production. Both sets of results largely support earlier investigations. While emotional objections to field afforestation were anticipated on theoretical grounds, they proved to be stronger obstacles to field afforestation than expected. Emotional objections were found to affect both those farms with continuous production strategies as well as those planning cessation, i.e. farms which would logically have benefited from the afforestation subsidies. The intrinsic value of field ownership and ties-to-place proved to be important elements in resistance to field afforestation. Objections were found to play a greater role in farmers' decision making concerning field afforestation than the preconditions, which were more acceptable to passive farms or farms otherwise about to cease agricultural production.

Local agricultural and forestry officials clearly protected sectorial interests in their assessments of agricultural and afforestation policies. Forestry officials were more flexible in terms of cross-sectorial values, especially when agricultural issues in their own commune were in question. All officials took more liberal attitudes to policies reducing agricultural production when they (abstractly) concerned the country as a whole than when (concretely) applied to their own commune. Thus, ties to place are shown to affect the rationality of advisors decisions making, which leads to the conclusion that national sectorial land use policies will work only as well as the willingness of local officials to administer them.

The current level of field afforestation activities is considered to be unsustainable. The policy of field afforestation is not considered to be related to the reduction of agricultural over production, but rather it is seen as a means of transferring economic resources to the countryside, mainly in the form of a pre-retirement or retirement "bonus" for ageing farmers. The empirical results are discussed in the context of sustainable rural land use, landscape management and multiple use policies.

Key words: Field afforestation, farmers' attitudes and values, social space, ties-to-place, intrinsic field value, institutional environment, agricultural and forestry policy, integrated land use policy, local advisors.

Publisher: The Finnish Forest Research Institute, Department of Forest Economics, Unioninkatu 40 A, FIN-00170 Helsinki, Finland. Accepted for publication by Arne Reunala, Research Director, in May 23, 1994.

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ISBN 951-40-1367-0
ISSN 0358-4283
Helsinki 1994

Cover photo: Afforested fields in eastern Finland. Ashley Selby

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Preface

This investigation, which has been conducted in the Department of Forest Resources of the Finnish Forest Research Institute, is part of a wider project which concerns primary sector resources and rural livelihoods. The investigation is also the latest in a series of investigations concerning field afforestation which have been undertaken in the Institute since the early 1970s.

The authors of this monograph have worked as a team, and the division of tasks has not been straightforward. Perhaps it can best be summarised by saying that because of his experience in the field, Selby has been responsible for the problem setting and frame of reference. Selby and Petäjistö, with the assistance of Mustonen (who has used the same material for an investigation concerning farmers' willingness to shift production towards forestry), have jointly taken responsibility for the questionnaire and field work. Selby has concentrated on analysing the material for southern Finland, reported here, while Petäjistö has concentrated on Northern Finland, and the making of regional comparisons. This latter work, like Mustonen's, is published separately.

The authors gratefully acknowledge the National Board of Agriculture, now part of the Ministry of Agriculture and Forestry, for invaluable financial support without which the investigation would not have been possible. Our gratitude is also extended to members of the investigation's advisory group who actively contributed to the progress of the study; as well as to Esa Ikäheimo, at the Ministry of Agriculture and Forestry's Information Services, who provided the material on which the sample was taken. Thanks, too, to Maija Ala-Siurua for her preliminary work on Finnish and EU legislation concerning field afforestation, to Tapio Selby who took on the exacting task of data compilation and initial processing, and to our secretary Helena Ahola for assistance at all stages. Finally, our thanks to the farmers and commune officials for their valuable time and for answering our inquiry so well, and special thanks are extended to the many farmers who sent us constructive comments, supplementary information and encouragement.

Ashley Selby & Leena Petäjistö

Helsinki, February 1994

The charming landscape which I saw this morning is indubitably made up of some twenty or thirty farms. Miller owns this field, Locke that, and Manning the woodland beyond. But none of them owns the landscape. There is a property in the horizon which no man has but he whose eye can integrate all the parts, that is, the poet. This is the best part of these men's farms, yet to this their land deeds give them no title.

Ralph Waldo Emerson, *Nature* (1836)

1 Introduction and aim

1.1 Failures and contradictions of land use change policies

Finland's agricultural policy objectives have remained much the same throughout the post-war period, and it should be noted that many parallels exist between this policy and that of the Common Agricultural Policy of the European Union (e.g. Kuhmonen 1992, Sirviö 1992). The basic targets of Finnish policy are (e.g. OECD 1975; 28–42, Ketunen 1981):

- full self-sufficiency in major food commodities, even in times of crisis;
- attempting to maintain a balance between demand and supply in the home market;
- safeguarding and improving the income level of farmers;
- developing the structure of agriculture, i.e. increasing scale, efficiency and intensity of production;
- maintaining the structure and level of the rural population.

The instruments to achieve these objectives have been, and are many. For example, agricultural prices and incomes are currently determined by the Farm Incomes Act, the level of production is controlled by quotas levies, tax incentives, etc. via the Act concerning Agricultural Production Regulation and Balancing; agricultural support schemes are directly linked to regional development policies, i.e. support schemes are in effect capital transfers from urban to rural areas; while pension schemes, holiday schemes, as well as farm enterprise support funds, etc. attempt to assist the social development of agriculture.

Underlying the whole agricultural structure and the policies relating to it is the principle of self-sufficiency in a time of crisis (which remains the main difference between Finnish and EU agricultural policies). This policy, which stems from recent Finnish history and the policy of neutrality, as well as Finland's geopolitical reality, is now being questioned, albeit hesitantly (see e.g. OECD 1989; 12–14, Maatilahallitus 1991). The OECD report is very explicit in its critique of the policy of self-sufficiency, arguing that the objective of maintaining agricultural

production in Finland at such a high level has imposed costs on the Finnish economy that have most probably reduced the rate of economic growth in relation compared to what it might have been in the absence of such costs. It states that "In order to attain this high production level, the agricultural sector has had to attract ... capital and labour that would have found use in other economic sectors... Depending on what the resources would have been worth in other economic activity, the misallocations (to agriculture) have been more or less serious." (OECD 1989a; 13).

The official long term agricultural development programme maintains the same policy aims as those outlined above, although with some modifications (Komiteanmietintö 1987:24; 114–116, Maatilahallitus 1991). Stress is placed on reducing the effects of imbalances in production and consumption by means of food industries. Importantly, and in line with GATT and OECD requirements, export subsidies are to be gradually abolished. Further, agriculture is to take account of environmental conservation. However, maintaining the income levels and structure of agriculture, as well as the policy of food self-sufficiency in the event of crisis, remain as policy anachronisms.

As early as 1960, two state committee reports considered that the area of arable land was already sufficient to maintain a level of 90 % self-sufficiency in basic foodstuffs (Komiteanmietintö 1960:9 – *Economic Planning Committee Report* and Komiteanmietintö 1961:1; 113 – *Forestry Planning Committee Report*). The Forestry Planning Committee Report estimated that to clear more forest land for fields would jeopardise the expanding wood working industries. Urging the cessation of land clearance activities, the report also stressed the need to prevent the fragmentation of forest holdings, and to restrict the changing pattern of forest ownership – problems which, like agricultural overproduction, remain unresolved. Similarly, Heikinheimo *et al.* (1963; 3,31) echoed the concern that any increase in the area of agricultural land would require increasing food exports with all its accompanying difficulties. Nevertheless, it was not until 1969 that the first serious attempts were made to reduce the area of agricultural land under cultivation. The primary means were the Field Reservation Act of 1969, later to be replaced by the Act Concerning Agricultural Production Regulation and Balancing, (supported by amendments to the Forest Improvement Act of 1967 to permit forest improvement funds to be used for field afforestation).

Despite aims to limit the level of agricultural production, the period 1967–1991 has witnessed a continuous increase in agricultural productivity (e.g. Yearbook of Farm Statistics 1992/93, Kettunen 1993). For example, there has been a 30 % increase in production (in real

terms) during the period, gross capital formation (in real terms) has almost doubled, while labour inputs have decreased by nearly half during the same period. Agricultural production subsidies have more than doubled in the period since 1987 (Table 1) encouraging the intensification of agricultural production. For example, the use of nitrogen fertilisers rose from 69 kg/ha in 1977 to a peak of 109 kg/ha in 1990, while field drainage activities have continued throughout the 1980s and 1990s at an average rate of 24 000 ha/year.

As a result of subsidised agricultural intensification, the need to remove land from production has increased considerably. It was estimated at the time of the first field afforestation programme (1969) that some 400 000 ha were surplus to requirement, but today this figure has risen to over 700 000 ha, that is to say c. 40 % of the total field area and 32 % of the area of fields under cultivation (Maatilahallitus 1991; 17). According to the same estimations, the number of active farms should be reduced from the current 129 000 to c. 44 500 by the year 2000 (Maatilahallitus 1991; 44). Agricultural production reduction subsidies have therefore become increasingly necessary, and they have recently increased dramatically, partly because of the field afforestation premium which was financed from the agricultural production balancing funds (Table 1).

Table 1. State subsidies to agricultural production (excluding crop damage compensation) and production reduction, 1986–1991, in 1985 fixed prices (after Kettunen 1993).

	1986	1987	1988	1989	1990	1991
	FIM millions					
Production subsidies	859	861	940	1574	1706	1807
Reduction subsidies	314	295	381	516	499	1063

Agricultural support policies of the 1980s also led to the over-valuation of agricultural land (Ylätaalo 1991). Supplementary agricultural land was in short supply and where it could be purchased or rented, the rational farmer had little choice but to intensify his production to offset the high cost, therefore exacerbating over-production problems. Where supplementary land was too expensive, or simply unavailable, a solution was to clear forest land and create new fields. During the period 1969–1990, an average of 3700 ha of new fields were created annually. Field clearances were indirectly encouraged by a much publicised, and politically sensitive, Act Concerning the Field Clearance

Fee (1987/602)¹. The 18-month delay between the introduction of the legislation to parliament and its coming into force gave rise to (or was designed to achieve) a bonanza of clearance activities, which exceeded 17 000 ha in 1986. In all, applications to clear over 30 000 ha of forest land were made prior to the introduction of the legislation. This bonanza was only natural given that the farming community were faced penalties for delaying any planned clearances activities, which in themselves were prompted by farmers' expectations that field cultivation had a profitable future.

Following the introduction of the field afforestation legislation in 1969, the first peak year for field afforestation activities was 1972 (Figure 1), at which time the extension services and nurseries had adjusted to the new situation. After 1974, when the set-aside programme ceased, and the "first takers" had been removed from the potential applicants, field afforestation activities fell slowly to c. 2500 ha/year. The introduction of the afforestation premium at the end of the 1980s, recent increases in the premium, as well as the increased concern over the future of agriculture, have recently led to a considerable increase in field afforestation activity, but the sustainability of this level of afforestation is open to question.

While considerable amounts of public money have been invested in field afforestation (Maa- ja metsätalousministeriö 1988), this has clearly had no effect on the level of agricultural production. On the other hand, field afforestation cannot be credited as having even a marginal effect on the supply of timber in the future, while the quality of stands established on former fields leaves much to be desired (Ferm & Polet 1991, Ferm *et al.* 1993).

Thus, agricultural land clearance and field afforestation activities have coincided, the effect of which has been to nullify any meaningful agricultural areal reduction advantages gained from field afforestation, figure 2. The balance for the 20 year period up to 1990 being only 5300 ha in favour of afforested fields!

1. Act concerning the field clearance fee (Pellonraivausmaksulaki 1987/602) imposes a charge, payable by the farm owner, and imposed by the relevant local agricultural authority for each are of land cleared for agricultural use during 1988. Forest and peatland, as well as land which has been cleared earlier, but not cultivated for ten calendar years or more are considered to be clearable land. The act will be reviewed yearly. The act also permits clearance activities on several conditions. These include i) the cleared area is not for agricultural production; and ii) an equal or larger area of existing fields will be afforested within three years at the owner's own expense. The current fee payable for clearance activities is 30 000 FIM/hectare (c. GBP 1800/acre).

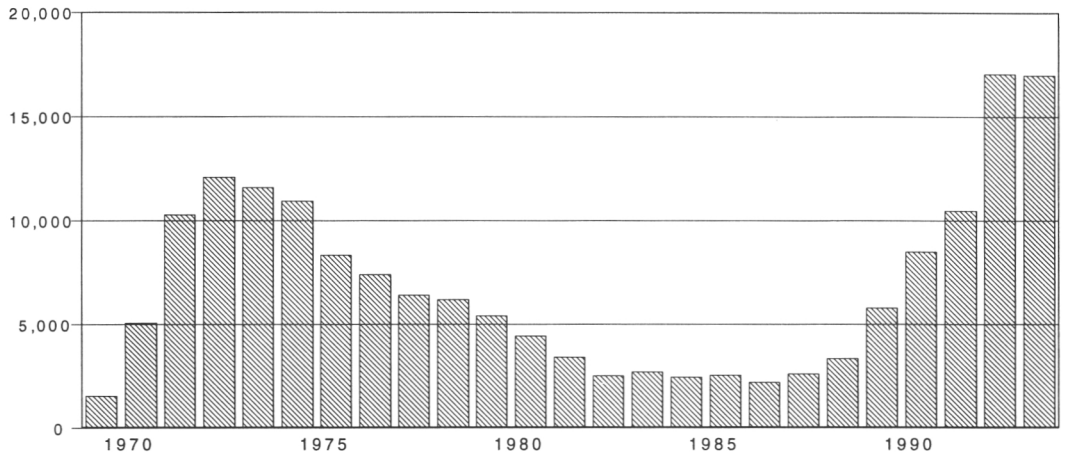


Figure 1. Field afforestation activities, 1969–1992

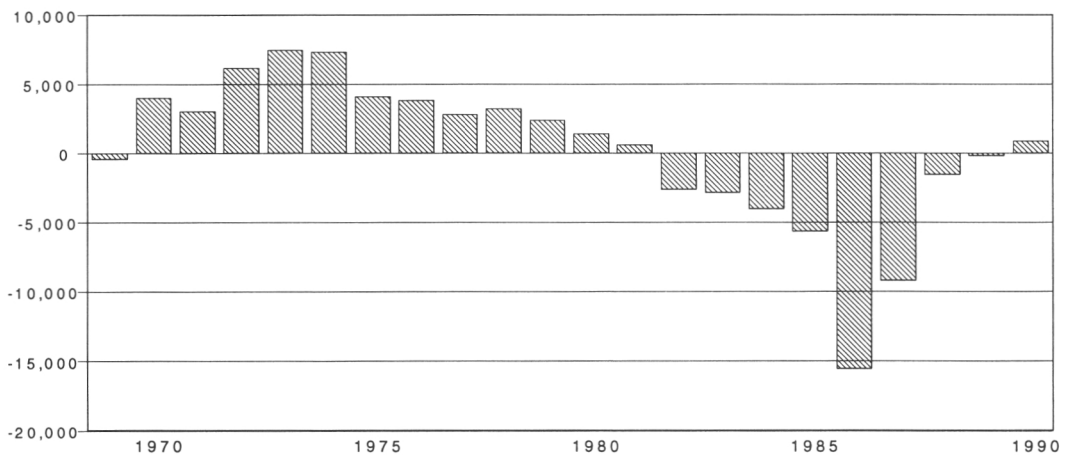


Figure 2. Annual balance between field clearance activities and field afforestation, 1969–1990

1.2 The aim of the investigation

On the basis of the above survey of recent policy trends, it would seem that the future development of field afforestation activities faces two possible alternatives. In the first alternative, field afforestation will again reach the targeted 10 000 ha/year, and this level will be maintained for a short time as declining or retiring farms are wholly or partially afforested. Trends at the beginning of the 1990s tended to

support this alternative. The second alternative is one in which despite short term afforestation "mini-booms", social resistance to further field afforestation will increase, irrespective of the size of the premium and other incentives involved.

The present investigation addresses these two alternatives by examining farmers' objections to and pre-conditions for accepting field afforestation. While the socio-economic processes behind field afforestation and other land use restriction measures have received attention (see Chapter 2), the behavioural processes which reduce farmers' and land owners' willingness to take advantage of policy instruments supporting land use change are less well understood. A behavioural approach to the investigation is therefore adopted.

While farm attributes affecting the decision to afforest fields will be examined, emphasis will be placed on the role farmers' values and attitudes in the acceptance or resistance to land use change policies. For example, special attention will be given to the role of the intrinsic value of field ownership in forming objections to and preconditions for field afforestation. The investigation also concerns the role played by the institutional environment and the representatives of rural corporate interests in hindering or advancing field afforestation policy. Consequent upon this approach, *recommendations can be made concerning policy adjustments that might improve the farming community's adoption of alternative uses of arable land.*

The questions raised by the future of field afforestation activities come at an interesting time. For example, recent increases in the premium for field afforestation have, in fact, resulted in an increase in field afforestation activities. This would seem to support the ambitious aims of the current field afforestation programme which seeks to achieve a sustained c. 10 000 ha/year and the eventual afforestation of over 200 000 ha of agricultural land (Maa- ja metsätalousministeriö 1988; 28). It is nevertheless doubtful whether the programme is realistic. Doubts arise because of the short-lived response to the first field afforestation cycle of the early 1970s in connection with the field reservation programme (Figure 1) These doubts are further supported by the fact that the field afforestation premium was suspended at the end of 1992, while the afforestation funds made available under the agricultural production balancing legislation has been reduced, and will be less than half the planned amount in 1994 (*Maaseudun Tulevaisuus* 28.12.1993; 5). These figures and trends suggest that the planned 10 000 ha/year afforestation objective is probably unsustainable, even if they were temporary achieved in the early 1990s. The frequent changes in the instruments for achieving the desired agricultural pol-

icy outcomes also tend to work against long-term land use change solutions by reducing their credibility in the eyes of the farming community, thereby supporting the second of the possible alternative developments outlined above. The most recent changes, which are likely to greatly reduce State support for the afforestation of fields, will naturally work against the first alternative.

The investigation proceeds as follows: first, a summary is made of previous investigations into problems concerning field afforestation (Chapter 2). Theoretical aspects of the investigation (Chapter 3) discuss the premises for a behaviourally oriented investigation of farmers' objections to or pre-conditions for field afforestation. The empirical material and the methods employed in the investigation are presented in Chapter 4. Chapter 5 examines the pre-conditions for and objections to field afforestation. These objections and preconditions are then examined in relation to a number of farm attributes (Chapter 6) and to specific attitudinal positions (Chapter 7). The institutional environment for field afforestation is briefly examined (Chapter 8) with reference to communal agricultural, trade and forestry officials views concerning aspects of field afforestation. The results are summarised and policy discussed in Chapter 9.

2 Previous investigations concerning field afforestation

2.1 The nature of earlier investigations

The field afforestation process has received intermittent attention from researchers over the past twenty years. Published papers and monographs have each approached the investigation of field afforestation process from different standpoints; standpoints which include both biological and human factors. As the present investigation is concerned only with the latter group, suffice it to say that considerable attention has been paid to most of the biological and physiological aspects of establishing forests on fields, see e.g. Laitinen (1988) for a wide ranging literature review, and Ferm *et al.* (1993) for a review of the current state of field afforestation research in Finland.

Concerning the human aspects of field afforestation, i.e. factors relating to human behaviour and decision making, much less work has been accomplished – even if work on the related process of field reservation is included. The investigations can, nonetheless, be grouped into two sets -i) structural-attitudinal, and ii) structural-spatial. In the first group, Numminen (1970) and Reunala (1981) have examined both farm-structure and farmer attitudes to questions concerning set-aside and the use of set-aside land (including its afforestation). Anttila (1990) investigated the structure and future land use, including field afforestation, of farms with farm retirement pension agreements (a form of set-aside). Anttila examines the nature of the retirement pension scheme and its participants, as well as a number of alternative futures. The structure-spatial group of investigations have centred on work by Selby (1974, 1980a&b, 1981, 1990a&b) and Mustonen (1990), at the Finnish Forest Research Institute.

In addition to these investigations, reports, memoranda, etc. have been compiled in various institutions, of which the report of the Ministry of Agriculture and Forestry's field afforestation working party (Maa- ja metsätalousministeriö 1988) is perhaps central, presenting as it does a review of the legislation, procedures, finance problems and economics of the field afforestation component of the Forest 2000-programme.

2.2 Structural-attitudinal investigations

Numminen (1970) presented the first review of the afforestation of farm land under the terms of the field reservation (set-aside) programme. Despite being based on a very small sample of farmers with set-aside contracts, Numminen's interview-based investigation revealed much of the essence of the field afforestation process which was to take place over the next 20 years. For example, only 15 % of the farmers in the sample intended to afforest all their fields, the remainder being retained for agriculture or sale. Similarly, only 22 % of the farmers intended to afforest their fields at the termination of their set-aside contract, with 67 % intending to return the land to cultivation. The intended afforestation amounted to 18 500 ha, with an extra 1000 ha of natural afforestation. Poorly located field, poor land, cessation of farming and objections to leaving land fallow were the main technical reasons for the afforestation of set-aside land. The main personal reasons being poor health, alternative profession, disillusionment with agricultural profitability and age. Attitudes towards field afforestation were found to be most negative in southern and central Finland, and least negative in eastern and northern Finland: a pattern which was revealed in subsequent activities (see Selby 1980 & 1990). In the light of experience (see e.g. Ferm *et al.* 1993) it is interesting to note that 85 % of all Numminen's respondents, i.e. both those favourable and unfavourable to field afforestation, were rather optimistic about the biological success of field afforestation.

A later investigation of land use decision making on set-aside farms (Reunala 1981) came to the same conclusions as Numminen with respect to the prime reasons behind the decision to afforest land at the termination of the set-aside contract, namely ill-health, old age and the low profitability of agriculture, and poor land or farm structure. Nonetheless, attitudes were also considered to play a role in the decision-making process. Notably, farmers with traditional rural oriented values and the attachment to land resisted field afforestation, preferring to continue set-aside. A similar set of attitudes was considered to underlay the decision to let, rather than sell fields to neighbouring farmers.

Anttila (1990) has investigated the future use of fields under agricultural suspension agreements within the terms of the Farm Closure Pension Act. These farms were found to be structurally oriented towards animal husbandry, possessed rather small areas of fields, but were nevertheless permanently occupied. The main reasons for entering the agricultural suspension agreement were, reflecting Numminen's investigation of 20 years earlier, poor health, age, invalidity of spouse, and lack of successor (i.e. children not willing to continue

farming). Anttila (*ibid*; 26, 85–91), using an *a priori* model closely resembling that constructed by Selby (1980a&b), also examined the willingness to afforest fields then under agricultural suspension contracts. The regression model containing 17 independent variables revealed the high importance of the afforestation premium in the willingness to afforest fields. Poor health and lack of successors also played a relative important role in the model. Otherwise, the variables describing various practical and attitudinal attributes with respect to field afforestation, possessed very weak degrees of determination. Nonetheless, these attributes were statistically significant at less than 5 % risk. The only variables possessing negative coefficients were those describing "emotional" attributes, i.e. "no personal benefit" and "emotional ties", as well as the practical opinion that the land was more suitable for cultivation.

2.3 Structural-spatial investigations

The earliest structural-spatial investigation into field afforestation revealed considerable regional variations in the intensity of both farm abandonment and field afforestation (Selby 1974). Not only was farm abandonment greatest in the eastern and northern regions of Finland at the end of the 1960s, but land clearance activities were also most intense in those regions as farms took advantage of agricultural improvement grants. A further contradiction in land use developments was the fact that a proportionally greater number of farms (17.5 %) in northern Finland entered set-aside contracts in the years 1969–1973 than elsewhere in the country (national average 11.9 %). Field afforestation of set-aside land, via the Forest Improvement Act, was nevertheless weakly developed in northern Finland, the main region for field afforestation activities being central and eastern Finland.

The processes explaining this variation was investigated on the basis of the theory of circular and cumulative causation (Myrdal 1957). The theory argues that once a region begins to grow or decline socio-economically, the forces creating the move away from equilibrium will cumulate, e.g. once a region begins to decline, its decline will accelerate unless an arresting force can be applied. The theory had been adapted to Finnish conditions (e.g. Riihinen, P. 1963, Riihinen, O. 1965), and specifically for Finnish farming by Hahtola (1973). Following Hahtola (*ibid.*), Selby (1980a, 1981) constructed a model to explain spatial variations in the intensity of field afforestation activities. The model hypothesised that land use change was dependent upon poor socio-economic structure in the countryside, and therefore formed part of the circular and cumulative process of social decay. To

test this hypothesis, an model was constructed to examine regional and local variations in the intensity of field afforestation:

$$y = b_0 + b_1PAS + b_2FOD + b_3PSEC + b_4IF + u$$

where: y = the intensity of field afforestation measured as a proportion of cultivated land, PAS = poor agricultural structure, FOD = farm ownership disturbances, PSEC = poor socio-economic conditions and IF = institutional factors (in this case the role of the forest improvement funds in the field afforestation process).

The model was tested employing both simple and complex variables, the latter being formed by factor analyses. The two aggregate levels were formed by forestry board districts for the regional analysis and the communes of Itä-Savo Forestry Board District for the local level analysis. The model estimations confidently demonstrated the effect on field afforestation of the structural change processes of the 1970s. Poor agricultural structure and farm ownership disturbances were highly significant in explaining the intensity of field afforestation at both regional and local levels. Poor socio-economic structure was also highly significant at the regional level, and significant at the local level. The reason for the lower significance at the local level was explained by the homogenous structure of the region in which the communes were located, (i.e. their was less variance in the data). At the regional level, the role of state support for field afforestation was also found to be significant, a result later confirmed by Anttila (1990; 87–91).

The regional level analysis was supported by farm-level analyses for a developing and a declining commune (Siilinjärvi and Savonranta respectively) (Selby 1980a&b). Farmers' age was found to encourage field afforestation in both communes, but less so in the developing commune; the better structural and productive conditions of the developing commune discouraged field afforestation; while farmers' reduced dependence upon farm incomes increased the likelihood of field afforestation, especially in the developing commune where there were greater opportunities for off-farm employment.

Based on similar criteria, Mustonen (1990) examined farms which had applied for permission to afforest fields between 1987 and 1989 under the terms of the Act concerning agricultural production regulation and balancing (1977/446). The two communes selected were both classed as strong dairying regions by a recent communal typology (Varmola 1987) but Liperi commune in eastern Finland is located in a region where field afforestation has been very intensive, whereas Kruunupyö in western Finland is located in a region with only slight field affores-

tation activities. In both communes, c. 70 % of the applicant farms had effectively ceased production (including farm closure pension farms, set-aside farms, farms with fallow contracts, etc.) thereby supporting Anttila (1990). Similarly, farms were found to be smaller than average, with a greater proportion of their area under forest (supporting Selby 1980, and Anttila 1990). Farms seeking afforestation premiums were more likely to have already entered into production restriction agreements (especially in Liperi) than for other farms, or to have already let their fields as supplementary land for neighbours (especially in Kruunupyy, in which fallow contracts were also common). Seeking farm typological differences between those farms seeking the afforestation premium and those not, Mustonen (1990) found active (dairy) farms to possess a low propensity to afforestation fields. More surprising was the result that farms with ageing owners did not possess the expected positive propensity to afforest fields. In Kruunupyy, stock and beef cattle farms revealed a clear propensity to afforest fields, while in Liperi the presence of supplementary incomes increased the propensity to afforest. A clear difference in the afforestation behaviour between the two communes was that applicants in Liperi intended to afforest over 50 % of their fields, whereas in Kruunupyy, applicants aimed to afforest only c. 30 % of their fields. Conversely, officials in Liperi applied stricter criteria for approval than in Kruunupyy. Mustonen's investigation can be considered to give considerable support to earlier investigations.

The structural-spatial process of field afforestation during the 1970s extended to the field level with an investigation of 157 fields in the commune of Savonranta (Selby 1980a&b). Of these, 30 fields were afforested. Attributes describing the physical, location and other properties of each field were based on the National Board of Agriculture's guidelines for a field inventory (Maatilahallitus 1972), and partly on agricultural production and location theories (e.g. Chisholm 1962, Pihkala 1991, Petrini 1964, Wolpert 1964, Pred 1967). The analysis (Selby 1980a; 93–100) revealed three sets of attributes which clearly encourage field afforestation: Historical factors (small fields, no access road); Ownership conditions (ownership change); and Physical conditions (steep slopes, low fertility, stoniness, waterlogging and summer frost).

2.4 Factors affecting farmers' decisions to afforest fields

The reports into field afforestation which have been summarised above provide a starting point for developing the frame of reference for the current investigation. The empirically verified models con-

tained in these reports already permit the drawing of certain conclusions (figure 3) and in so doing relieve the present investigation of the task of repeating much of this ground.

The three sets of **farm related attributes** specified are, in fact, inter-related and are separated only for operational convenience. They are i) farm structural attributes, ii) farm management criteria, and iii) farm ownership conditions.

Farm structural attributes are known to affect the decision to afforest, with a positive relationship between poor farm structure and field afforestation activities, and a negative relationship between a farm's use of its means of production and field afforestation. Following this, *farm management criteria* also affect the propensity to afforest fields, positively if dependence on agricultural incomes is reduced, and vice versa. Similarly, *farm ownership conditions* are interrelated with management criteria, with short planning horizons (consequent upon old age), lack of successors, etc. tending to favour the field afforestation decision.

Exogenous factors affecting field afforestation fall into two groups: i) institutional factors, and ii) the socio-economic environment. *Institutional factors* are determined by land use policy and policy means (legislation, grants, etc.), as well as the information flow concerning policy means (e.g. extension services, courses, etc.). It has been demonstrated that entrepreneurs in rural areas (many of whom are farmers) possess very passive attitudes to information and information gathering and therefore fail to take advantage of the whole range of business opportunities in the environment for business (e.g. available grants, tax-relief, etc.). On the other hand, the importance of grant-aid, and other public financial incentives in achieving field afforestation are recognised. The *socio-economic environment* has also been demonstrated to be a significant factor with respect to the propensity to afforest fields. Spatial variations in field afforestation are directly related to regional and local variations in the degree of socio-economic development, while the socio-economic difference between communes may be sufficient to bring about different decision-making behaviour with respect to the afforestation decisions, not only with respect to farmers but also with respect to favourable decisions on the part of local officials and advisory personnel.

Special attention is given to **farmers' values and attitudes**, although these are not necessarily separable from other farm-related criteria. For example, it could be argued that farm ownership conditions affect farm management criteria directly via farmers' attitudes and values; in direct consequence of life-cycle effects. Be this as it may, values are

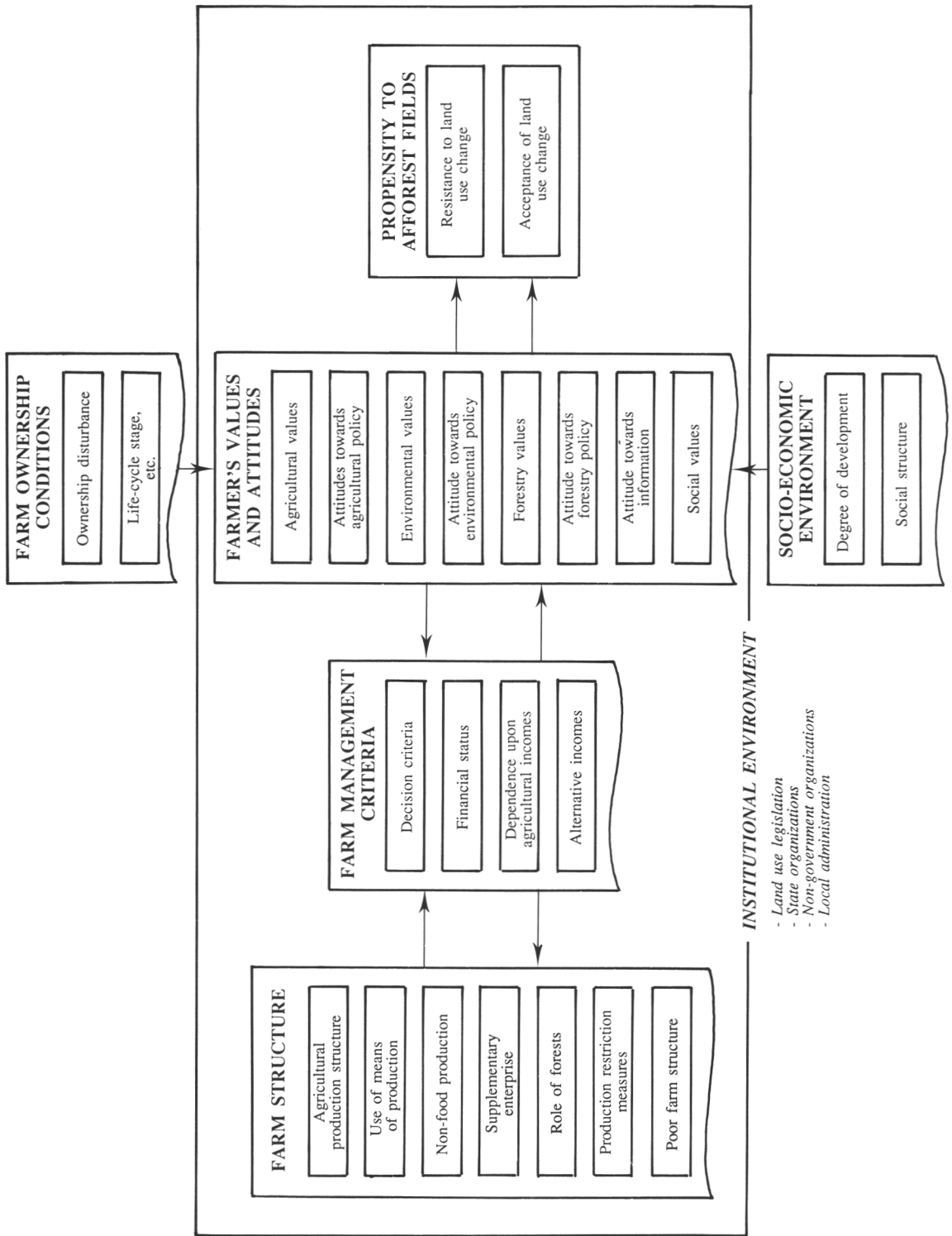


Figure 3. A frame of reference for examining farmers' objections to and preconditions for afforesting fields

seen at the outset of this investigation to be of vital importance to the resistance to field afforestation which has been experienced in Finland during the past 20 years. Support for this hypothesis is found in central Europe where the policy and instruments to encourage set-aside and field afforestation are relatively young, but where resistance has been such that the legislation has already been renewed to strengthen the incentives to farmers to afforest fields. Because of the fundamental role values are assumed to play in the field afforestation decision making process, they are considered to constitute the frame of reference proper for this investigation are discussed in detail in the following Chapter.

3 Personal values and the decision making environment

3.1 Epistemological setting – the individual and society

In the previous chapter, farm ownership, farm structure and farm management attributes, as well as socio-economic environmental factors were found to have had a recurring role in explaining field afforestation. These previous results naturally form part of the frame of reference of the current investigation. There has also been an undercurrent of value assessments in these earlier evaluations of field afforestation, notably in work by Reunala (1981) and Anttila (1990). These assessments are important, as they reveal much about the way in which policies work at the grass-roots level, and so determine whether or not a given policy will be successful in achieve set goals, e.g. in achieving a given area of set-aside or field afforestation. The present investigation pays particular attention to the question of values and their affect on the success of policy instruments.

Attitudes and values, as such, create part of the individual's interface with his environment, and therefore help to create the decision-making environment. This contention is not new, of course. Hahtola (1973; 9–16) had subjected the rationale of the decision making process to critical analysis. He identified three approaches to the study of decision making: First, a causal approach in which decision making and behaviour are based on the principles or reductionism with the individual being a product of his environment. In the second approach, Hahtola argued that mental and physical phenomena are not reducible to a common denominator, and that different sets of control are required to deal with the physical and the mental, i.e. the strict separation of facts from values. Thirdly, Hahtola followed Ahmavaara (1970) in presenting a cybernetic or systems approach to the decision making process. This latter approach is holistic, as it seeks to include mental phenomenon, purposive behaviour and value judgements. Further, no stipulation is made of the separate realms of mental and physical events. Hahtola clearly supported the latter approach and argued for the awarding of equal philosophical status to both mental and physical phenomena in the analysis of purposive behaviour. The current inves-

tigation, which is closely linked to a phenomenological existentialist epistemology², implicitly accepts this position.

The position outlined above does not, of course, exclude a relationship between the individual and his environment. On the contrary, given that the individual is no longer seen as a deterministic product of his environment, it becomes possible to examine the dialectic relationship which exists between man and his environment.

There are several ways in which the individual and his (social) environment interact. Society may be considered to influence directly on the individual, creating an exogenous constraint upon human agency. This process is often termed *reification* (see Gregory 1981). The reverse can also be argued, i.e. that society is constituted by the intentional action of individuals. This is the *voluntarism* of Weber (see Gregory 1981). In recent years the voluntarist critique of reification has led to what Gregory (1981, following Berger & Luckmann 1966, and Ley & Samuels 1978), calls *dialectic reproduction*. A situation in which "reality is a social construction...that acts back upon its subjects, sometimes in ways that remain unseen and taken for granted" (Ley & Samuels 1978; 12). Ley (1978; 52) argues that there is a synthesis which can account for "the dialectic relation between the structural realities and the human enterprise of constructing reality", while Duncan (1978, also citing Berger & Luckmann 1966) argues that "man produces a world both of abstraction – that is, ideas values, norms of conduct – and of real concrete objects, which, although they are his own product, he nevertheless permits to dominate him as objective, unchanging (truths)". This investigation accepts the postulates of dialectic reproduction.

Acceptance of the *taken-for-granted-world* concept referred to above, places the investigation in a phenomenological perspective; a perspective dedicated to the understanding of the interaction of the individual and his lifeworld. Ley (1977; 505) also presents the argument that "Actions are intentional and purposive, they have meaning, but access to this meaning requires knowledge of the motives and perceptions of the actor, his definition of the situation", noting that meanings are rarely private, but are shared and reinforced in peer group action. While the individual clearly plays a creative role in forming the society in which he lives, the dialectic process creates a feedback to which the individual is not immune. Thus, each individual has a history and a

2. Reference is made e.g. to: Billington (1990), Buttimer (1976), Entrikin (1976), Gibson (1978), Gregory (1981a&b), Grene (1959), Harris (1978), Hiedegger (1927), Johnston (1983), Ley (1977, 1978 & 1981), Pickles (1985), Rose (1981) and Samuels (1978a&b) as discussed in Selby (1984 & 1989).

geography which imposes constraints within his life-world, so begins the dialectic between creativity and determinism, charisma and institution, a dialectic which for the geographer becomes that between man and place (*ibid.*). This is an important contention with respect to the problem in hand. The field as an entity has been created, often in recent history, it is an "institution" and it central to the dialectic between farmer and place. This relationship is to be discussed further in section 3.4, concerning social space.

There is also a second, and frequently more binding, set of constraints upon action in everyday life. These, according to Ley (*ibid.*; 505), are forces internal to the life-world of the individual and his/her group. "In the process of group consolidation, its collective view of the world becomes more telling on the individual, as he becomes successively more 'included' in it. So, too, his action becomes identified with group norms...The phenomenological model of man is one of a life-world with a group-centred reality". The discussion will return to the importance of the group shortly.

Economic and social theories have often addressed the same dialectic. For example, Myrdal (1957; 30–31) has argued that social factors are important in the cumulative process towards regional inequality. All relevant adverse changes that originate outside a region are effects which, by way of migration, capital movements, etc., *affect the whole spectrum of social relations*. Indeed, the role of social relations within a region are of considerable importance in forming social attitudes towards economic activity and socio-economic change and innovation.

These relations can be studied further with reference to Tönnies' *Gemeinschaft* and *Gesellschaft* concepts (Tönnies 1957) or Rogers' *Traditional-Modern* concepts (Rogers 1968). Similarly, Pred (1969; 51) points out that the imprint of traditional societies on personality types may well discourage innovating behaviour in the population, thereby preventing any increase in the flow of information³. Pred (1967; 90) also points out that psychological ties to place, desire for social approval and other "personal" and non-economic reasons are frequently consequential decision determinants. Localities, according to Pred, become "change resistant"⁴.

Thus, by implication, cultural background plays a significant role in determining the life philosophies and value systems of individuals.

3. For empirical support of this contention, see e.g. Selby (1989).

4. Localities also feature in the development of "ties-to-place" which will be discussed further in section 3.4.

These create psychological needs in the individual, which he/she attempts to satisfy. The individual's awareness of these needs is prompted by the cultural environment. Thus, changes in the environment which challenge these value systems and which threaten to compromise the individual's needs, will be met with fear and hostility. The changes in Finland's agricultural policy priorities during the 1990s present such a situation, just as the set-aside programme met with hostility during the early in 1970s (see e.g. Selby 1974)

3.2 Some aspects of rationality, aspiration and farmers' decision making

The discussion so far has been concerned with the individual and his social environment. However, certain assumptions are also to be made concerning individuals' behavioural traits. Following recent experience in examining rural enterprises (Selby 1989, Selby & Petäjistö 1992), the present investigation adopts the principle of bounded rationality, which attributes to the individual intendedly rational behaviour only with respect to the limit of his knowledge and ability of his own world, but not with respect to the "real world", of which he has imperfect knowledge.

Motivation and aspiration are important aspects of decision making. In recent investigation so of rural enterprise, especially farm-related supplementary enterprise, the behavioural concepts of bounded rationality and satisficing man have been shown to have demonstrable utility (e.g. Selby 1989, Selby & Petäjistö 1992)⁵. In the case of bounded rationality, it is assumed that the decision maker makes rational decisions with respect to his own lifeworld (i.e. with respect to the quantity and quality of the information in his possession, and with respect to his ability to use that information). the satisficing concept is related, but here for one reason or another the decision making limits his aspiration and/or motivations to a level he regards as satisfactory, but which may not be optimal. Wolpert (1964), for example, was able to demonstrate that farmers in Middle Sweden were acting in a boundedly rational in using only 70 % of there potential productive capacity. The main reason for the short-fall being the farmers' satisficing behaviours.

Of importance in the present context is that for a group of persons (e.g. farmers) the compromises made in the satisficing process may differ

5. See also Brinkmann (1935), Simon (1957a&b), Petrini (1964), Wolpert (1964), Pred (1967 & 1969), Smith 1979 and Earl (1983).

from individual to individual. This is because a number of values may be in question, and these do not necessarily have a common denominator. For example, the farmer may compare two alternative life styles in terms of profit, pleasantness of work, self-fulfilment, prestige, environment, etc., these alternatives will therefore possess several components, each of which will be judged by the decision maker in the context of his aspirations (current and future). Simon (1957a; 251–2), for example, argues that under such circumstances the decision maker will seek a minimum guaranteed pay-off to his choice. Thus, it can be expected that some farmers will accept the pay-off of the afforestation fee, and other material benefits of field afforestation, while others will place higher value on maintaining fields intact, either for reasons of agricultural production or for personal (emotional) reasons.

It is in this context that the role of agricultural and forestry advisory bodies, and the efficiency of the interpretation and administration of policy instruments must be considered to have a direct bearing on the decision making process; especially with respect to farmers. Advisory officers, by the very nature of the "informed advice" they offer can sway farmers' decisions in favour of one set of pay-offs or another, i.e. with respect to alternatives offered by agricultural or forestry policies. This is therefore the way in which policy means are applied "in the field"; and so the motives, means and consequently achievements may vary considerably from those envisaged by the policy planners who view the problem "top-down". Mustonen (1990), for example, found empirical evidence of this process in a study of field afforestation which examined the role of local officials in granting farmers' permission to afforest their fields.

Finally, the life-cycle of the farm management process is also considered to be related to farmers' motivations and aspirations. It does not require complex social theory to realise that a farm, like any family firm, is subject to a *life-cycle*, or a series of life-cycles, based on the transference of ownership from one farming generation to another, nor is it difficult to see how motivation and aspiration relate to farmers' future aspirations in agriculture. Farmers facing retirement may experience a lowering of personal economically oriented aspirations and motivations, but they are nevertheless likely to possess family-inspired aspirations (passing on a productive farm to the son, or heir) as well as longer term motivations (keeping the land in the family, etc.). Even in the case of failed aspirations (consequent upon management failure, upon exogenous circumstances, or upon the absence of a successor) farmers may wish to maintain traditional values (established by peer groups and *taken for granted*), preferring to let or sell their fields rather than abandoning or afforesting them (arguments concerning social norms are recalled at this juncture).

Further, investigations of the farm-transfer problem have demonstrated that in an industrialising society, and perhaps even more so in the post-industrial society, the transfer of ownership from one generation to another no longer guarantees the continuation of farming (e.g. Anttila 1990, Ripatti 1991, Ihalainen 1990). Selby (1980) also demonstrated that the generation transfer process was one of the mechanisms behind the acceptance of field afforestation and set-aside in the 1970s. Thus, farms facing the generation transfer process can be expected to exhibit uncertainty in their management criteria, especially where the continuation of farming is no longer certain. Such disturbances can be expected to lead to an increased willingness to consider field afforestation.

3.3 The significance of space and place

3.3.1 Social Space

Earlier in this chapter, it was argued that physical and mental values form a holistic system, and following Hahtola (1973) and Ahmavaara (1970) a cybernetic model could be presented of the decision making environment of the individual. The discussion now returns to this process, and examines how the dialectic "reality" of the individual is, in fact, a social construct. Two concepts are considered; first there is *social space*, which can be seen as an institutional construct of reality, secondly there is *place*, which is seen as a personal construct of reality.

The concept of *social space* – is, according to Lefebvre (1991; 33), a space which "...incorporates' social actions, the actions of subjects both individual and collective who are born and who die, who suffer and who act. From the point of view of these subjects, the behaviour of their space is at once vital and mortal: within it they develop, give expression to themselves, and encounter prohibitions; then they perish, and the same space contains their graves. From the point of view of knowing (*connaissance*), social space works (along with its concept) as a tool for the analysis of society. To accept this much is at once to eliminate the simplistic model of a one-to-one correspondence between social actions and social locations⁶". The concept is therefore well suited to the phenomenological epistemology of much of this investigation.

First, social space is seen as a language, imbued with social values. But, by the very nature of containing values, social space contains power-relations. Discussing the relationship between language and

6. For a fuller definition of *social space*, see Lefebvre (1991; 26–46).

space, Lefebvre (1991; 130–131) asks whether spaces formed by practico-social activity (i.e. landscapes, monuments or buildings) have meaning? – and answers in the affirmative. At least in the context of the present investigation, and especially in the context of *genius loci* and ties to place, the affirmative answer to Lefebvre's question is particularly relevant. Thus, the agricultural cultural landscape, as noted above, is symbolic of a particular society *and its reproduction*⁷. *This practico-social space (landscape) is a language embodying many of the values of that society. The extent to which this space can be treated as a message is defined by the way society or individuals read this message, and in the case of the rural landscape it hardly needs to be stated that it is a symbolism which is almost universally understood.* This is reflected in contingent valuation studies of agricultural landscapes (e.g. Drake 1987, Willis & Garrod 1991). It is even more clearly demonstrated in a study by Nassaur (1988) of farmers' landscape values in the face of the need for less intensive and environmentally friendly agricultural methods. The language of the lightly ploughed fields with its projecting stubble, once seen as "poor practice" which "let down the neighbourhood", has become the spatial language for good environmental husbandry (stewardship).

Following the structuralists' argument, space produces a language which reflects the power structures of society (Pred 1984). Lefebvre (1991; 84) presents a similar argument. He recognises that the "raw materials" of space are taken from nature, but these raw materials are the products economic and technical activities; they are consequently political and strategic spaces. Space is argued to depend upon social superstructures. Thus, each of the institutions of the state calls for space – but space which can be organised according to their specific requirements (*ibid*; 85).

Cloke & Goodwin (1993; 168–169, citing Lipietz 1988) present similar arguments in a discussion of the structural coherence of rurality. They argue that many of the contradictions of the capitalist mode of production are overcome by regulation. This regulation includes the incorporation of social elements into individual behaviours so as to establish norms habits and customs suited to the reproducing regulatory system. (In the case of the agricultural sector, regulation can best

7. The process of social reproduction is, of course, central to the humanistic philosophy of structuration, or structuralism. Pred (1984; 280), for example, notes that social reproduction is an on going process that is inseparable from the everyday performance of institutional activities (e.g. the family). The performance of such activities results in the perpetuation or modification of the institutions themselves, of the knowledge necessary to repeat or create activities, and of already existing structural relationships.

take place via the control and production of the space in which it operates). Cloke & Goodwin (*ibid.*), also note that regulation can never be all embracing, as it is always subject to contestation and conflict. They also note that "any change in regulation, whether by state intervention or by means of social...opposition will in turn lead to changes in the experience of rural places and lifestyles of rural people. We can thus interpret not only changes in rural production but also changes in "the living and thinking and feeling of life" (Gramsci 1971) in rural areas, which occur along side economic change".

3.3.2 Social space and the institutional environment for field afforestation

As outlined in section 1.1, the means to reduce agricultural production which have been attempted over the past twenty years have not achieved the stated aims. This may be because the policy means have not been accurately targeted, but it could be the result of conflicting interests within the policy-making echelons of the corporate state as they seek to maintain their relative control over social space.

Institutional control in Finland is manifested via the civil service, of which the upper echelons, e.g. permanent secretaries, senior civil servants, directorates of state boards and commissions, etc., are invariably political appointments. Each political party uses its relative power in the coalition governmental system to forward its own corporate interests via these civil service appointments. This is particularly the case in agriculture, forestry and regional affairs. For much of the post-war period, both the powerful presidency, and two key ministries (the Ministry of Agriculture and Forestry, and the Ministry of the Interior, which is responsible for regional and rural policies) have been under Centre Party control. This party, as the former Agrarian Party, has its electoral base in the countryside, supported by many first or second generation middle class urban dwellers with strong personal ties to the countryside. The Centre Party's power is further enhanced by its close liaison with the Central Association of Agricultural Producers (MTK). These two politically-related institutions have not only dominated the formation of rural policy making, but they have also had a very strong influence over the appointment of senior officials in primary sector research and higher education. Thus, the institutional control noted above is supported by a complementary process of institutional management, i.e. the Ministry of Agriculture and Forestry and the Association of Agricultural Producers (MTK) are involved in all state – farmer related negotiations. Thus, these central actors in the corporate state have been able to "manage" the exogenous pressures for agricultural reform.

The power-groups within the corporate state have, via the taxation system, institutionalised the dependence of agriculture on ever-increasing capital and material inputs; for example, the price and taxation systems overlap with respect to farmers' "interests", as well as those of the suppliers of machinery and agrochemicals. Indeed, the present tax system would appear to introduce a bias towards capital investments, e.g. the excess use of machinery at all stages of production, is encouraged by way of depreciation practices being over-weighted, while the outlay inducing inputs are generally tax-deductible. It can therefore be argued that individual farmers are acting rationally when they maintain, and even increase, the current high level of production. This is because producer prices for agricultural products have been totally rationed and perfectly unaffected by competition.

A clear institutional barrier to integrated land use planning is the fact that responsibility for matters of land use is scattered throughout much of the administrative machine. Thus, the Ministry of Agriculture and Forestry is responsible for agricultural, forestry, hunting and fishing, veterinary and regional policy issues; the Ministry of the Environment maintains responsibility for environmental protection, which includes water, nature protection, waste disposal and air and noise pollution. The extractive industries are mainly under the control of the Ministry of Industry and Trade, but are also partly covered by the previous two ministries; and so on. The concentration of decision making on unco-ordinated, but nevertheless highly centralised state institutions brings additional problems, e.g. each of the institutions has its own administrative network. These networks are not coterminous, which seriously hinders policy co-ordination and integration (OECD 1988; 68–69, Nordisk 1987:3, Weckman 1990).

Given the empirical evidence, presented in section 1.1, of contradictions in land use policy emerging from just one ministry, whose departments would appear to act in total independence of each other, any hope of three or four ministries, and at least twice that number of ministerial departments co-ordinating their efforts to achieve an integrated land use policy would seem to be remote.

The above arguments seem most appropriate for the present investigation. This is because the afforestation of agricultural land *reduces the social space* of the agricultural sector and its (institutionalised) corporate interests, while at the same time altering the state of the productive structure and nature of rural areas. With this in mind, the contention (Lefebvre 1991; 104) that the social space of institutions is "inherent to property relationships (especially the ownership of the earth, i.e. land) and also closely bound up with the forces of production (which impose a form on that earth or land)" becomes indisput-

able. By way of this production, space acquires a political economy, representing power relations. This gives reason to suspect that the policy of field afforestation is unlikely to be very successful. The argument for this being that the vested interests of the agricultural institutions will resist field afforestation. This resistance being manifested via reluctance, at the local level, to seriously advance field afforestation via the well developed agricultural advisory system.

3.3.3 Personal space and field afforestation – the importance of place

The investigation concerns farmers' preconditions for and objections to the afforestation of fields. The field, however, is a *construct* with considerable *symbolic value*. It is the result of an historical process of settlement and "pioneering" land for cultivation – a process of recent history in Finland. For this reason it is hypothesised that this symbolic value, acting through the psychological mechanism of *genus loci* or *ties to place*⁸, *may be a significant factor in the farmers' decision making*.

Tuan (1974b; 213) defines place as follows: "As location, place is one unit among other units to which it is linked by a circular net; the analysis of location is subsumed under the geographer's concept and analysis of space. Place, however, has more substance than the word location suggests: it is a unique entity, a 'special ensemble' (Lukermann 1964; 70); it has a history and meaning. Place incarnates the experiences and aspirations of a people. Place is not only a fact to be explained in the broader frame of space, but it is also a reality to be clarified and understood from the perspectives of the people who have given it meaning."

Tuan (1974b; 233–245) stresses the meaning and stability of place, arguing that the personality of a place arises when people, in describing a place special to them, use expressions which carry a greater emotional charge than merely locational or functional terms. Such places become 'unique' – "places like human beings acquire unique signatures in the course of time" (*ibid*; 234). Thus, "the personality of place is a composite of natural endowment (the physique of the land) and the modifications wrought by successive generations of human beings" (*ibid*; 234)⁹

8. The importance of place and ties to place have also received attention in the social sciences literature, for example, in geography and social anthropology (see e.g. Tuan 1974a&b, 1975, 1977, Devereaux 1992, Devereaux et al 1989, Lowenthal 1961, Desbarettes 1983, Wright 1947, Relph 1970, 1976). For a forest-oriented approach see e.g. Lucas 1991; 38–43.

In his deeply thought-provoking book *Rational Landscapes and Human Geography*, Relph (1981; 168–175), like Tuan, is concerned with the individuality of people and the places they create. While acknowledging that "to be human is to be a distinctive individual responsible for one's own thoughts and actions" (*ibid*; 171), Relph argues that the individuality of place is not self-created, it is accorded: for example, "a landscape is always an aggregation of objects and organisms arranged in a singular pattern which is the product of the interaction of physical, ecological, historical, economic and random processes." Accordingly, the historical process may drastically change any given district or place with new roads, new buildings, repair and maintenance of the infrastructure, etc. and yet the essence of the place may remain intact. Relph therefore argues that "the individual distinctiveness of a place ... lies not so much in its exact physical forms and arrangements as in the meanings accorded to it by a community of concerned people, and the continuity of these meanings from generation to generation" (*ibid*; 172).

It does not require a great deal of imagination to see how this argument applies to the problem of field afforestation. The creation of the agricultural landscape, particularly at the parochial-level, has been a dynamic historical process affecting the whole community. Field afforestation would seem to sever this historical process.

Thus, when considering the interaction of people, policies and land use in the context of rural vitality, the symbolic value of the land should not be under estimated (see e.g. see Jung *et al.* 1978). Land use patterns reflect not only the physical nature of the region (the topology, structure of the soils and macro- and microclimates, biotopes, etc.), but they also reflect the socio-economic history of his home area. Thus, physical nature and the cultural landscape produce both "natural" and "cultural" symbols. Indeed, Lefebvre (1991; 141) is most specific about society's emotional investment in symbols, claiming that early agricultural and pastoral societies knew no such split between the practical and the symbolic. In such a context, the afforestation of fields clearly possesses considerable environmental implications, to which the discussion returns in Chapter 9.

Symbols, therefore, are both reproduced and reinforced by rural society as a part of the historical process of settlement and "pioneering" land for cultivation. This process continued until the Post-war period in Finland, and for this reason it is suggested that this symbolic value,

9. Structuralists present similar arguments. For example, according to Pred (1984; 280), place is an historically contingent process conceptualised in terms of the unbroken flow of local events.

acting through the psychological mechanism of *ties to place*, may not be an insignificant factor in the farmers' decision making with respect to field afforestation. Indeed, it is again argued that the symbolic value placed on fields is firmly embodied in the corporate institutions of the agricultural sector.

The above discussion on place and space may seem disproportionately detailed. No apology is offered, or required, as the position raised by the discussion firmly underpins the whole question of radical land use policy changes which effect the reproduction of vital rural social and economic structures. The temporary or permanent removal of fields provides such a case. It is not difficult to see that policies aimed at land use change, (set-aside, or the afforestation of agricultural land), are policies which change or effectively destroy shared, stable places with their own individualities. Similarly, such policies are likely to be met with resistance in the effected community. An individual's decision to afforest fields has repercussions which effect the whole matrix of place relationships within the community.

The final word in this discussion on place is given to D. H. Lawrence:

"... every people is polarised in some particular locality, which is home, the homeland. Different places on the face of the earth have different vital effluence, different vibration, different chemical exhalation, different polarity with different stars: call it what you like, but the spirit of place is a great vitality."

D. H. Lawrence (1923) *Studies in Classical American Literature*.

4 Materials and methods

4.1 Population and sample

The population of the investigation consisted of all privately-owned farms holding three hectares or more of arable land. *Privately owned* was considered to include private individuals, family concerns, estates & heirs. A lower limit of three arable hectares was chosen because this is a commonly used lower limit in agricultural and forestry investigations, and it is also the lower limit used in State legislation e.g. the compulsory fallow order.

The sampling method was systematic, based on the Agricultural Register. The sampling frequency for southern Finland was chosen subjectively at 1:6.

In order to take into consideration the socio-economic typology of Finnish communes or municipalities, the sample was taken from eleven communes in southern Finland and nine communes in northern Finland (farmers' objections to and pre-conditions for fieldafforestation in northern Finland are dealt with in detail in Petäjistö & Selby 1994a). The socio-economic typology employed was that constructed by Varmola (1987) for the Finnish Academy of Science's Rural Development Project. By employing the so-called restricted sample (Varmola 1987; 12–15, 23–5 & 31–37), communal types were represented in the sampling in the same proportion as they occur in the country at large (Appendix 1 and Table 2).

4.2 Data collection and response

The data was collected by mail questionnaire (see Petäjistö *et al.* 1992) to 1702 farm owners (Appendix 2). Of the farms in question, 806 were located in Southern Finland and 896 in Northern Finland. The initial response rate was 64 % (1096 replies), but after unacceptable replies had been rejected, 1069 replies formed the basis of the data compilation. Missing information was acquired, where possible, from the Agricultural Register and by inquiries to the communes' agricultural officials.

The current investigation, the material was restricted to the farms in Southern Finland. The reasons being that farmers in Northern Finland have been earlier shown to behave differently with respect to field afforestation (Selby 1981), and the behaviour of Southern Finnish farmers are considered to be closer to that of their peers in central Europe.

After eliminating incomplete responses, 441 farms remained in the sample for Southern Finland, of which 304 (69 %) were active farms and 137 (31 %) passive farms, i.e. farms no longer economically active. The mean field area was 13.1 ha for active farms and 12.4 ha for non-active, or passive farms.

A subsequent inquiry concerning the views of local officials concerning rural development and land use policies, especially field afforestation, was addressed to the agricultural, forestry and trade & commerce advisors employed by the communes in which the farm inquiry was made. As might be expected, the response was 100 %, the only discrepancy being that some communes did not possess all three officers. To assist comparability, several sets of questions concerning policy measures were similar or identical to those asked of farmers.

Table 2. Sample communes in southern Finland and their agricultural structure (Maatilarekisteri 1987, Table 2.7).

commune	type	farm	flds ha	mean ha	flds cult %	sample 1:6
Myrskylä	DF	226	490	21.7	98.0	38
Pöytyä	IA	500	1011	20.2	98.5	83
Uvila	IG	242	412	17.0	97.0	40
Koski HI	DF	262	496	18.9	97.5	44
Urkala	IA	669	1122	16.8	96.5	111
Taipalsaari	DP	303	298	9.8	92.0	50
Puumala	GD	442	316	7.2	90.5	74
Kontiolahti	GD	592	507	8.6	88.5	99
Pielavesi	DF	953	954	10.0	87.5	158
Korpilahti	GD	564	477	8.5	90.5	94
Lehtimäki	DP	332	357	10.8	87.8	55
Total		5085	6445	12.7	93.7	846

Where:

DF = Strong dairy farming communes

IA = Intensive agricultural communes

IG = Industrial growth communes

DP = Declining primary production communes

GD = Generally poorly developed declining communes

4.3 Material and analytical methods

The material for the investigation was derived directly and indirectly from the postal questionnaire. Those variables obtained directly from the questionnaire are numbered according to the questionnaire, e.g. variable x19a concerns question 19a. A number of variables were calculated on the basis of the questionnaire data and these variables are given a separate notation, e.g. the ratio of field area to forest area, xfld-for (Appendix 4).

While the analytical approach to the investigation is based on variations of the linear model, the application of these techniques, is not dogmatic. The reason for this qualified approach is found in the phenomenological epistemology which underlies the investigation. Thus, while the signs of the relationships between the "dependent" and "independent" attributes will be hypothesised and tested, less attention will be given to the size and forms of the functions involved -*interpretation* being of central importance. The primary reason for such an approach is the complex interrelationships which always exist in socio-economic and behavioural attributes, as outlined in detail in Chapters 2 & 3.

The data matrix provides a set of variables describing various aspects of the elements of the causal model (Figure 3), and it is in the interests of efficiency and returns on the investment in field work to maximise the use of the variance provide by the data. Of the several multivariate analytical methods available, principal components and discriminant analyses have been selected to optimise the use of variance in the data set. SYSTAT-software (Wilkinson 1988) has been employed throughout the analysis.

Principal components analysis has the ability to extract the maximum variance from the data set, and so help to identify "basic dimensions" in the data matrix. These are properties which are useful in examining the inter-related socio-economic and attitudinal attributes central to the investigation (e.g. Johnston 1978, Elffers 1980, Valkonen 1981, Ranta *et al.* 1989). As always with the method, caution is required, as mathematical solutions are guaranteed. Whether or not the solution can be given a logical interpretation requires close adherence to theoretical expectations, as well as further analyses to examine the behaviour of each component and its interpretation (see e.g. Elffers 1980). For example, a component is considered to be stable when a new variable subsequently added to the solution behaves in a (theoretically/interpretationally) predictable manner; i.e. loaded in such a way that the components original interpretation is not distorted. In the case of

unstable solutions, the addition of one extra variable can destroy the original mathematical form and interpretation.

The technique of adding variables to a principal components solution is used to advantage for examining the relationship between complex attributes represented by components and a set of dependent variables representing various aspects of farmers' objections to or pre-conditions for field afforestation. The method is akin to regression analysis, in that the way in which a given dependent (added) variable behaves in the component solution determines the relationship between the component (representing the independent variable) and the independent variable (e.g. Valkonen 1981; 118–121). The approach is not without its weaknesses, and its success is dependent upon the stability of the basic component solution.

In cases where the stability of the solution was doubted, the relationship between any component and dependent variable was tested by computing the component scores and correlating these with the dependent variables and assessing the significance of the coefficients obtained. Generally speaking, correlations between the dependent variables and the component scores were of the same sign and order of magnitude. In some cases, however, the loadings of the dependent variables seemed to "exaggerate" the relationship between the dependent and independent variables (components), an effect which merely assisted the interpretation. An additional advantage of employing correlation coefficients was that probabilities could be estimated, whereas the statistical significance of loadings of dependent variables on components would have been difficult to estimate. Relationships were also tested with regression techniques where this was considered to be advantageous, the t-test being the prime objective. However, these results are not reported, but are summarised in Petäjistö & Selby (1994a).

Discriminant analysis is a useful technique for examining the attributes which discriminate between given groups (e.g. Johnson 1978). As grouping variables were available, the method was employed discretely in the present investigation.

Given the diverse methodological approach, analyses would be very tedious to report and to read. To avoid confusion of detail, only selected analyses are reported in detail, although reference is made to supplementary analyses where this is to advantage.

5 Farmers' preconditions for and objections to field afforestation

5.1 Recent afforestation activities

Prior to examining farmers' preconditions for and objections to field afforestation, a review is made of those farms which had already afforested some of their fields or who, at the time of the inquiry, planned to do so. In the event, 19 % of the farms had already afforested some fields but only 6 % (27 cases) were planning to afforest fields during the period 1991–92.

Examining previous and current afforestation activities by farm type (Table 3) demonstrates the (known) trend for passive (non-active) farms to have a greater interest in field afforestation. Thus, nearly half of the uncultivated farms and nearly one quarter of the farms with set-aside or leased fields possessed afforested parts of their fields. Active farms were naturally more modest in their field afforestation activities. Even so, the figures for previous field afforestation on active farms were higher than expected.

The 27 farmers who were planning field activities at the time of the inquiry were asked to give reasons for their decision to afforest in

Table 3. Previous and current field afforestation activities, by farm types¹, %

Farm Type	Previous afforestation n = 83	Afforestation 1991/2 n = 27
<i>Passive farms:</i>		
Uncultivated (n=17)	47	18
Set-aside or leased fields (n=120)	23	11
<i>Active farms:</i>		
Active but production unknown (n=10)	10	0
Arable (n=112)	17	7
Animal husbandry (n=182)	15	2

¹The typology also reflects a hierarchy of labour requirement: farm uncultivated (no labour requirement); Fields leased or set-aside (little or no labour requirement); Active farm (production line not known); Arable farm (part-time labour requirement); Livestock farm (full-time labour requirement).

1991–1992 (Table 4). The most common reason was given as "fields no longer required" (x28b) which understandably was the overwhelming reason in the case of passive farms (82 % confirming this reason), but also for active farms (40 %).

With respect to the passive farmers, the next important reason for afforestation was a production shift to forestry (x28h), a reason which figured less prominently with respect to active farms. Active farms gave importance to insecurity caused by GATT and EU negotiations (x28a) (30 %), which again was less important for passive farmers (12 %), who by definition can be considered to be disinterested in the future of farming. Fears that permission to afforest fields would become more difficult in the future (x28d), a fear justified soon after the inquiry took place (for financial rather than political reasons), was important in the decision making on active farms (30 %). Indeed, this result supports the hypothesis that the recent "boom" in field afforestation activities has been caused just by the process of encouraging those farmers who would otherwise have afforested fields in due course: just as in the case of the field afforestation associated with field reservation in the early 1970s (see section 1.2).

Active farmers also considered field afforestation as a substitute for compulsory set-aside (x28g) to be of importance in the decision to afforest, as well as other reasons (x28i). The reasons for afforestation

Table 4. Principal reasons for farmers' decisions to afforest fields in 1991/1992, by farm types, %

Reason for afforestation 1991–1992	Passive n = 17		Active n = 10		All n = 27	
	No	Yes	No	Yes	No	Yes
x28b – Fields no longer required	18	82	60	40	33	66
x28d – Fears that permission to afforest will become more difficult	82	18	70	30	78	22
x28a – Insecurity resulting from GATT & EU negotiations	88	12	70	30	81	19
x28g – Substitute for compulsory set-aside	94	6	70	30	85	15
x28h – Production shift to forestry	76	24	80	20	78	22
x28i – Other reasons	88	12	70	30	85	15
x28e – Best alternative to cultivation	94	6	90	10	93	7
x28f – Landscape reasons	88	12	100	0	93	7

intuitively seemed to fall into several groups, and principle component analysis was employed to search for such basic dimensions (Table 5).

The pc-solution explains 78 % of the variance, which given the small number of observations (n=27), can be regarded as satisfactory. The components are interpreted as follows:

Aff1 – Best land use alternative: The three variables strongly and positively loaded on the component concern rational land use reasons for field afforestation. The strongest being that field afforestation is the best alternative to cultivation, the second strongest being that afforestation is a substitute for compulsory set-aside. Landscape reasons are more subjective, and almost certainly contain value judgements, but nevertheless the reason is positive.

Aff2 – Anxiety concerning the future: The strongest loading here is that of concern over uncertainties brought about by GATT and EU negotiations. Also strongly loaded is the fear that the application system for field afforestation will become more difficult.

Aff3 – Forestry orientation: The third component is characterised by the very strong loading of x28h (farm to specialise in forestry). This is supported by a weaker by positive loading of fear that the application

Table 5. Rotated principal component solution for reasons for 1991 & 1992 field afforestation decisions.

	Aff1	Aff2	Aff3
x28e	0.91	0.04	0.18
x28g	0.82	-0.11	0.09
x28f	0.67	-0.06	-0.43
x28a	-0.17	0.90	-0.14
x28d	0.12	0.75	0.48
x28h	0.06	0.03	0.90
Variance explained, %	33.36	23.32	21.50
Eigenvalues	2.04	1.62	1.03

Where:

x28a – Insecurity resulting from GATT and EU negotiations

x28d – Fear that application will become more difficult

x28e – Best alternative to cultivation

x28f – Landscape reasons

x28g – As a substitute for compulsory set-aside

x28h – Farm to specialise in forestry

system will become more difficult. Thus the "fear" element has two components, one associated with future policies (as in Aff2) and the other, as here, concerned with possible obstacles to the expansion of farm forestry. Landscape reasons for field afforestation acquire a negative loading indicating that economic criteria are here more important than subjective ones.

The analysis of current field afforestation decisions is not taken further at this juncture as it was not the purpose of the investigation to do so. However, the results achieved above form a useful background to the analysis of farmers' preconditions for and objections to field afforestation which follow.

5.2 Future plans to afforest fields

The main purpose of the investigation is to examine farmers' preconditions for and objections to field afforestation. It is therefore pertinent to inquire as to how many farms are planning to afforest fields. Given that agricultural policy is now changing, and that ageing farmers' time horizons are restricted, a planning period of five years was adopted (Table 6). It is also important to recall that at the time the inquiry was made (1992), the financial incentives for field afforestation were at their peak, but the likelihood of their continuation was already being doubted.

The known fact that farmers no longer actively cultivating their land have a greater tendency to afforest fields is again supported by Table 6. The table nonetheless reveals that it is only uncultivated farms (which form less than 4 % of the sample) which indicate a strong tendency to afforest all their fields. All other farm types, including the (passive) farms with set-aside or leased fields (27 % of the sample),

Table 6. Farmers' intentions to afforest fields in the next five years, by farm type, %

Farm type	All fields (x19f)			Poor/marginal fields (x19g)		
	unlikely	cns	likely	unlikely	cns	likely
Uncultivated farm (n = 17)	35	24	41	6	41	53
Fields let or set-aside (n = 120)	57	28	15	29	34	37
Active but production unknown (n = 10)	70	20	10	40	40	20
Arable farm (n = 112)	75	21	4	49	29	21
Livestock farm (n = 182)	85	14	2	65	23	12
All farms	72	20	8	65	23	12

show a marked rejection of the afforestation option. The situation with respect to the afforestation of poor or marginal fields is little less negative. The passive farms show greater interest in this option, but active farmers reject it.

5.3 Farmers' preconditions for considering field afforestation

While it was assumed at the outset that the majority of farmers would oppose field afforestation, no assumptions were made concerning the preconditions for encouraging field afforestation. The preconditions under examination (Table 7) are all economic. A decrease in agricultural support (x29a) is here regarded as a precondition which will tend to force farmers toward the field afforestation option, and it is therefore regarded as a *push*-mechanism. Conversely, acceptance of the financial incentives for field afforestation (x29b & c) is regarded as a *pull*-mechanism. A third precondition considered here is that of short-rotation forestry in association with a waiving of the current field clearance fee. The short rotation option is, of course, unique in that it offers *reversible field afforestation*. Short rotation species are grown as coppices for usually five to seven years before harvesting. Rarely does the crop exceed a height of three or four metres, and the harvesting method is an adaptation of agricultural practices. Short rotation tree crops can therefore be seen as an extension to or diversification of agriculture, rather than forestry *per se* with its 80 to 120 year rotations.

A notable feature of Table 7 is the ambivalence of many farmers over a number of issues. This behavioural characteristic will be found many times throughout the investigation. Passive (non active) farmers, and even the small *Active* group, are particularly unwilling to make commitments concerning field afforestation, preferring to "wait and see". Passive farmers, with their farming operations over, they could also be considered to no longer care! However, as the investigation will demonstrate when considering objections to field afforestation, this does not appear to be the case.

Another tendency revealed by Table 7 is the expected increase in the rejection of preconditions for field afforestation at the active end of the hierarchy. An average of 52 % of the livestock farms reject all four preconditions, especially the push-precondition of decreasing agricultural support. In other words, the majority of farms practising animal husbandry reject field afforestation even under deteriorating conditions for agriculture. The situation for the arable farmers is very simi-

Table 7. Farmers' preconditions for afforesting fields, by farm types, %

Precondition	Uncultivated n = 17			Set-aside n = 120			Active n = 10			Arable n = 112			Livestock n = 182		
	disa- gree	cns	agree	disa- gree	cns	agree	disa- gree	cns	agree	disa- gree	cns	agree	disa- gree	cns	agree
x29a = Decrease in agricultural support	6	53	41	29	55	16	50	50	0	59	31	11	62	27	12
x29b = Increase in fee and other incentives	6	41	53	23	37	40	30	50	20	46	29	25	49	23	28
x29c = Fee paid as lump sum	12	29	59	25	47	28	30	60	10	45	35	20	51	34	15
x29d = use of short-rotation species and waving the field clearance penalty	18	47	35	35	51	14	20	60	20	36	29	36	47	29	24

lar, with the main exception is an interest in the precondition that fields could be afforested with short-rotation species and that the reclaiming of the field at a later date would not incur the field clearance fee (x29d).

Farmers in the unspecified active farm group are mostly ambivalent about the preconditions for field afforestation, but while the "cannot say" are in the majority, opposition to the preconditions generally receive greater support than their acceptance. However, it has to be remembered that only ten farms are in question.

Farms with set-aside or leased fields also generally reject the preconditions for field afforestation. This is a logical outcome, as these farms already receive income from their fields, either from set-aside subsidies, or from rent. However, 40 % of these farmers would accept the precondition of increased field afforestation subsidies (x29b), which supports the above arguments that these farmers seek income from their fields.

The final farm group, the passive, uncultivated farms, generally lean towards the two *pull*-preconditions (x29b&c), and despite some ambivalence, 40 % would also react to the push-precondition (x29a) of reduced agricultural subsidies. However, given their passive status, these farms are presumably receiving income via the measures for agricultural production balancing.

A further observation before leaving the discussion based on Table 7: despite its fairly modest showing, the short-rotation precondition (x29d) nevertheless receives systematic support from one quarter of the farmers in the sample, while further 43 % show ambivalence, or a "wait and see" attitude. It must be noted, however, that short-rotation forestry still face technical, economic and market problems, nor is it generally accepted by the farming community.

The precondition variables are entered into principal components analysis in order to assess their mutual association. Three clear components are identifiable (Table 8), and they account for c.98 % of the total variance. The first component is very dominant, as can be seen from the eigenvalues.

Affpos1 – Financial compensation or *pull* precondition: The lump-sum fee motive (x29c) and increased compensation motive (x29b) are strongly loaded on the component. Thus as the component strengthens these attributes increase in importance. The component can therefore be considered to represent an afforestation compensation or *pull*-

mechanism. The financial aspect of the component is supported by the weaker but positive loading of x29a concerning agricultural support reductions.

Affpos2 – Short-rotation alternative: This is a simple component with only the single loading. In further analyses the component can be replaced by the original variable.

Affpos3 – Agricultural income decline or *push* precondition: The strongest loading on the component is x29a which concerns willingness to afforest in the event of the decrease of agricultural subsidies. It is, like affpos1, a financial motive, but in this case a *push*-mechanism is in question; i.e. field afforestation will be considered if agricultural support reductions make agriculture less "profitable". The *pull* aspect of the compensatory mechanism is present in the factor as the weak positive loadings of x29b and x29c.

Components Affpos1 and Affpos3 form a *push-pull* continuum concerning farmers' motives for considering field afforestation. The isolation of the short rotation option (x29d) is interesting, as it complements the *push-pull* mechanism of the other two components.

The strongest variables in each component (x29c, x29d and x29d respectively), and these rather than component scores, will be used in subsequent analyses to represent the three dimensions. The reason for this being the fact that original variables are less complicated in their interpretation.

Table 8. Varimax pc-solution of preconditions for field afforestation

	Affpos1	Affpos2	Affpos3
x29c	0.90	0.17	0.29
x29b	0.83	0.17	0.40
x29d	0.18	0.97	0.15
x29a	0.42	0.19	0.88
Variance explained, %	42.99	26.02	25.81
Eigenvalues	2.70	0.75	0.34

where:

x29a – Will afforest if agricultural supports is decreased

x29b – Will afforest fields if fee and other incentives increase

x29c – Will afforest if the afforestation fee is paid as a lump-sum

x29d – Will consider afforestation if short-rotation (energy) species are in question and that the fields could be returned to agricultural without penalty.

5.4 Farmers' objections and preferred alternatives to field afforestation

On the basis of the frame of reference, and especially the discussion concerning space and place, it can be expected that objections to field afforestation will play an important part in determining how farmers respond to this policy. These expectations gain considerable support from the analysis so far.

In the interests of clarity, Table 9 is reduced to passive and active farms. Tabulating objections by all five farm types naturally gave similar results, but the large array proved difficult to apprehend. The main difference between the two classifications being that uncultivated farms (in the broader classification) were overwhelmingly ambivalent to the objections – the "cannot say" response for each objection averaging 53 %.

The objections of both passive and active farms are surprisingly similar, and are centred on economic and emotional criteria. Indeed, it is difficult to determine whether "good fields", for example, is an economic or emotional response. Only the economic objection that fields are required to secure income (x30b) is for obvious reasons not so important on passive farms. The emotional content of the objections gains support from the inclusion of the general objection that fields should not be afforested because their clearance required hard work (x38) – a sentiment which gains considerable support. Of particular interest, when considering the discussion on the importance of space and place in the frame of reference, is the systematically strong support given to the objection concerning the preservation of the agricultural landscape (x30j) as well as the purely emotional objection (x30f).

Farmers' objections to field afforestation were also examined using discriminant analysis employing the broader five-farm *a priori* classification (Table 10). The two most striking results from this analysis are the strong coefficients obtained by the good fields objection (x30c) and the preservation of the agricultural landscape (x30j) for all farm groups. The latter objection being evenly loaded, whereas the good fields objection naturally gains in strength when progressing up the typological hierarchy (from uncultivated farms to Livestock farms). Thus, despite their non-active or passive status, the **uncultivated** and **set-aside** farms still object to the afforestation of good fields. In the case of set-aside farms, of course, the result is logical, as setting-aside or leasing fields creates a source of income while maintaining the integrity of the field. Further, the objection that the size of the afforestation premium in relation to the price of fields (x30m) also receives

Table 9. Farmers' main objections to field afforestation, by reduced farm types, %

Objection	Passive n = 137		Active n = 304		All n = 441	
	disagree	cons	disagree	cons	disagree	cons
x30c = Good fields	13	36	8	18	10	24
x30b = Fields require to secure income	28	47	11	16	16	26
x30f = Emotional reasons	27	29	18	23	21	25
x30n = Afforestation is irreversible	14	42	11	30	12	34
x30j = Preservation of the agricultural landscape	18	36	16	26	17	29
x30m = Size of premium in relation to the price of fields	20	55	24	38	23	43
x30l = Field clearance fee restricts land use decision making	26	60	23	42	24	47
x30g = No personal benefit in field afforestation	27	43	31	35	30	37
x30k = A non cultivation agreement is a better alternative	30	52	27	48	28	49
x30i = Uncertain future ownership conditions	36	50	40	44	39	46
x30d = Sale of fields of greater benefit	33	55	37	48	36	50
x30e = Leasing the fields of greater benefit	23	51	39	45	34	47
x30h = Complicated administrative process	37	55	48	41	45	46
x38 = Fields should not be afforested because their clearance required hard work	31	22	19	16	23	18
			47	64	64	59

Table 10. Summary of discriminant analysis of farms groups by objections to field afforestation

Univariate F-test	F	p			
x30c – Good fields	9.86	0.00			
x30e – Leasing fields of greater benefit	5.67	0.00			
x30n – Afforestation is irreversible	4.79	0.00			
x30m – Size of premium in relation to the price of fields	3.75	0.00			
x30f – Emotional objection	2.93	0.02			
x30l – Field clearance fee restricts land use decision making	2.93	0.02			
x30d – Selling fields of greater benefit	2.27	0.06			
x30j – Preservation of the agricultural landscape	2.03	0.09			
Multivariate test: Wilks' Lambda = 0.79, F=3.30, DF = 32,1583; p=0.00					
Canonical loadings	1	2	3	4	
x30c – Good fields	0.69	0.48	-0.02	0.24	
x30d – Selling fields of greater benefit	0.02	0.30	-0.83	0.20	
x30e – Leasing fields of greater benefit	-0.37	0.67	-0.48	0.20	
x30f – Emotional objection	0.39	0.08	-0.26	0.19	
x30j – Preservation of the agricultural landscape	0.28	0.13	0.26	0.49	
x30l – Field clearance fee restricts land use decision making	0.39	0.04	-0.20	-0.37	
x30m – Size of premium in relation to the price of fields	0.23	0.59	-0.17	-0.64	
x30n – Afforestation is irreversible	0.40	0.55	0.13	0.16	
Group classification functions	Farm types				
Objection	uncult.	setaside	active	arable	livestock
x30c – Good fields	1.12	1.66	1.84	2.10	2.16
x30d – Selling fields of greater benefit	0.44	0.59	1.52	0.90	0.73
x30e – Leasing fields of greater benefit	0.96	1.20	0.01	0.61	0.48
x30f – Emotional objection	0.69	0.70	1.25	0.93	0.88
x30j – Preservation of the agricultural landscape	1.32	1.49	1.36	1.34	1.49
x30l – Field clearance fee restricts land use decision making	0.84	0.54	1.03	0.75	0.76
x30m – Size of premium in relation to the price of fields	0.78	0.93	0.15	1.07	0.93
x30n – Afforestation is irreversible	0.69	1.12	0.67	1.04	1.11
Constant	-10.87	-15.17	-14.57	-17.11	-16.70

fairly strong coefficients, indicating the retention of sound assessments, economic and/or intrinsic, of the value of fields.

For the **uncultivated farms**, these objections are further complemented by the objection that the field clearance fee restricts land use decision making (x30l), which receives a fairly strong coefficient.

The **set-aside & leasing farms**, by definition, prefer to lease fields than afforest (x30e). This group of farms seems to place on fields an intrinsic value, an interpretation supported by the fact that the objection that field afforestation is irreversible (x30n) also receives a strong coefficient. Similarly, the objection to the field clearance fee (x30l) is maintained.

The two groups of passive farms therefore maintain a clear set of objections to field afforestation, objections which are both economic and emotional, and they also concern the integrity of the social space and place in which they are located, as demonstrated by the preservation of the agricultural landscape objection (x30j).

The unspecified **active** farmers are associated with a different set of objections. Selling fields in preference to field afforestation (x30d) receives a strong coefficient, which suggests that the value of the field *as a field* is retained: This interpretation is supported by the strong coefficient of emotional objections (x30f), as well as the strong coefficient of x30l (field clearance fee restricts land use decision making). This latter objection contains considerable policy implications. The very presence of Act Concerning the Land Clearance Fee which places a penalty on the creation of fields, is likely to act against the afforestation of marginal or poor quality fields on active farms, because any future clearances for rationalisation will be penalised.

Arable farmers are identified with four major objections: the good fields and landscape objections noted above, as well as the objection that field afforestation is irreversible (x30n) and the objection that the size of the afforestation premium is not in relation to the price of fields (x30m). The latter is a logical objection for active arable farms which wholly depend on field crops! Emotional objections (x30f) and selling fields (x30d) also receive fairly high coefficients.

Livestock farmers possess similar objections to the arable farms, with the exception that the size of premium objection (x30m) and the emotional objection (x30f) receive slightly weaker coefficients.

Active farmers can therefore be seen to place greater stress on economic objections, good fields (x30c), afforestation irreversible (x30n),

the size of the afforestation premium (x30m), which is a natural concomitant of productive farming. Nonetheless, the strength of the preservation of the agricultural landscape objection (x30j) demonstrates active farmers' concern with ties-to-place and maintaining their social space.

The predictive discriminant classifications for the five farm groups was not particularly successful (36 %), but reducing the groups to the passive-active dichotomy produced an analysis with a virtually identical interpretation and a classification accuracy of 68 %.

Farmers' objections to field afforestation were also examined using principal components analysis. A three-component model (Table 11) of farmers' objections to field afforestation was considered to be acceptable. Models with extra variables and more components marginally increased the explanatory power of the solution, but the interpretations of the resulting components were less satisfactory. The 60 % level of variance explanation can, in any case, be considered satisfactory in an attitude model of 441 observations. In the event, the variables included in the pc-solution are very nearly the same as those found to be most successful in the discriminant analysis, reported above.

Table 11. Rotated pc-solution of objections to field afforestation

	Affneg1	Affneg2	Affneg3
x30f	0.73	-0.00	0.15
x30j	0.63	-0.08	0.23
x30n	0.55	0.12	0.34
x30h	0.53	0.37	-0.30
x30e	0.05	0.87	0.04
x30d	-0.00	0.87	0.13
x30c	0.25	0.17	0.80
x30b	0.14	-0.01	0.77
Variance explained, %	20.01	21.23	19.25
Eigenvalues:	2.34	1.52	0.98

Where:

x30b – Fields require to secure income

x30c – Good fields

x30d – Sale of fields of greater benefit

x30e – Leasing the fields of greater benefit

x30f – Emotional reasons

x30h – Complicated administrative process

x30j – Preservation of the agricultural landscape

x30n – The afforestation decision is irreversible

Affneg1 – Emotional objections: The first component brings together variables x30f and x30j with the strongest loadings, which immediately suggests emotional ties-to-place which are linked to the agricultural landscape. Supporting this is the strong loading of x30n, representing the irreversibility of the afforestation process, which together with the previous loadings suggests an interpretation representing *continuity*. The fairly strong loading of x30h, concerning the complicated administrative process, is less easily explained, although it will be noted that its is a complex variable, being loaded on all three components. In other experimental models, the variable frequently became isolated, and so its presence may be mathematically rather than theoretically justified. On the other hand, given that negative attitudes to field afforestation are in question, the administrative "difficulties" may be considered an "excuse" for rejecting field afforestation. Given this interpretation, the objection is emotional, and clearly belongs to this component. The component is, perhaps, more clearly defined than had been expected at the outset, despite theoretical expectations concerning emotional aspects of field afforestation .

Affneg2 – Field tenure change preference: The strong, positive loadings on this component concern variables describing land ownership or tenure change. The administrative difficulties variable (x30h) is also represented as a weak positive loading. Given the large number of observations, the loading of good fields (x30c) is significant, which supports the interpretation. The component can therefore be considered to represent farmers' preference for maintaining the economic integrity of his fields either by sale or by leasing, a response supported by the (weak) loading of x39c (good fields). The administrative objection, discussed above, again seems an emotional rather than a rational response.

Affneg3 – Security of income, or the active farming objection: The two strongest loadings on this component concern good fields (x30c) and field required to secure income (x30b). The positive, or fairly weak, loading of x30n (field afforestation irreversible) also lends to the interpretation that the component concerns the use of good, productive fields. The agricultural landscape motive (x30j) is also loaded on this factor, suggesting that the farmer places intrinsic value on the farming (as a contribution to the cultural landscape). The component represents the standard, and logical, argument against field afforestation: i.e. that active farmers require their fields to practice their business, although the presence of the landscape variable suggests emotional as well as rational objections to field afforestation.

Not unsurprisingly, the three components strongly reflect the results of the discriminant analysis. Economic objections account for 21 % of

the variance in the model, closely followed by emotional objections (20 %), and finally land tenure preferences (19 %). The two multivariate analyses, together with the tabulation results, give good reason to argue that these three sets of objections are deeply rooted in the farming and rural community and that they will continue to create considerable barriers to the wider acceptance of field afforestation. It is, perhaps, not such a surprising result for active farms, but that similar conclusions can be applied to passive farms must give considerable pause for thought amongst policy makers.

5.5 Additional considerations

The inquiry also included some general questions concerning the sufficiency of policy instruments for encouraging field afforestation as well as for encouraging landscape farming – an alternative under public debate at the time of the inquiry.

Of the 441 farmers in sample, only 33 % considered the premium sufficient compensation for the loss of fields, 54 % considered the premium too small, the remaining 13 % could not express an opinion. Only 68 farmers ventured to estimate the premium they would find acceptable. The range was very large, and answers contained emotional implications, such as "the same as a Minister's salary". Some answers were below the premium, and revealed considerable lack of information concerning the financial aspects of field afforestation. The mean was FIM 20 000 /ha and the median FIM 15 000/ha, at a time when in southern Finland the highest premium was c. FIM 9000/ha.

Planting and seeding, otherwise known as artificial regeneration, is the standard forest renewal or establishment procedure in Finland. Nonetheless, it is not without its critics, and as Ferm *et al.* (1993) have shown, artificial regeneration on former agricultural land is particularly problematic because of the high levels of soil nutrients. To assess whether such problems might reduce farmers' sympathies for field afforestation, an attempt was made to determine whether natural regeneration (all other things being equal) might be more acceptable. In the event, 27 % of the respondents favoured natural to artificial regeneration. However, 47 % answered that they could not say. The result is therefore inconclusive.

On the other hand, farmers' acceptance of the idea of a landscape management premium, as an alternative to field afforestation was less ambivalent, with 43 % favouring the idea and only 14 % rejecting it. The landscape management premium was set at a mean of FIM 5360/

ha/year (median FIM 3000/ha/yr) by the 101 farmers answering this question, again including rather absurd upper figures. The fact that the public debate on the subject of landscape management, or landscape agriculture, has not defined the concept in a meaningful way, not to mention operative difficulties, give cause to accept any research results with scepticism¹⁰.

10. The question of landscape management is discussed in more detail in section 9.3.2. and 9.3.3.

6 Farm attributes affecting field afforestation decisions

6.1 Ownership conditions and the decision to afforest fields

The investigation seeks to model farmers' resistance to or acceptance of land use change, especially with regard to field afforestation. As noted in the review of earlier investigations which formed part of the frame of reference for the investigation, farm ownership disturbances have been found to affect farmers' propensity to afforest fields. Selby (1980) found ownership criteria to be ambiguous, depending upon the socio-economic environment of the community in which the farm was located. Regression models concerning the afforestation of the retirement pension set-aside land (Anttila (1990) present evidence that ownership disturbance remains a relatively weak factor (the very weakness presumably being attributable to the contractions found by Selby 1980). Similarly, Mustonen (1990) modelling farms which had opted for the afforestation fee, found ownership disturbances to be significant as discriminators of farms with or without afforested fields.

Much has been talked about non-farmer farm and forest ownership in recent years in Finland (e.g. Reunala 1974, Ripatti 1992, Ihalainen 1990), as non-farmer ownership is considered by some to have a negative effect on forest management. In the present data, signs of ownership disturbance were present, but not to such an extent as to warrant concern. For example only 12 % of the farms were in the hands of heirs – 83 % being in private ownership. Only 16 % of the respondents foresaw that generation transfer would take place in the next 5 years, reflecting the relatively low average age of the respondents (49.7 years). The farmers' age structure within the present sample is shown in Table 12.

Of the farm owners in the present investigation, 70 % earned more than 50 % of their income from agriculture, with just over a quarter earning less than 50 %. Similarly, 83 % of the respondents lived on their farm throughout the year, and almost 70 % were actively engaged in farming.

Table 12. Farmers' age group, by farm types, %

Farmer's age	Uncultivated n = 17	Set-aside n = 120	Active n = 10	Arable n = 112	Livestock n = 182
Under 35	6	4	20	10	14
35 to 40	6	3	10	19	17
41 to 50	12	25	30	29	28
51 to 60	29	31	30	17	26
61 to 65	24	10	10	10	9
Over 65	24	0	0	16	5

Table 13. Length of occupancy, by farm types, %

Length of management	Uncultivated n = 17	Set-aside n = 120	Active n = 10	Arable n = 112
Under 10	47	22	10	34
10 to 20	12	26	40	28
21 to 40	24	35	40	28
Over 40	18	17	10	11

Table 14. Length of family ownership, by farm types, %

Length of family ownership	Uncultivated n = 17	Set-aside n = 120	Active n = 10	Arable n = 112
Under 10	6	2	0	2
10 to 40	12	14	30	12
41 to 100	41	62	60	62
Over 100	41	22	10	24

Other ownership factors which will become important in this investigation are the length of present occupancy, and especially the length of time a farm has been in the farmer's family. These are shown in Table 13 and 14. The mean for the occupancy, or length of management, (19 years) accords well with the mean age of the farmers, as it can be assumed that generation transfer would have taken place when the farmers were c. 30 years old. The average length of time for family ownership is long (86 years, s.d. 71.3, max. 455). The investigation will return to this in Chapter 7.

In order to optimise the use of variance, basic dimensions in the data matrix were again sought with the aid of principal components analysis. After experimenting with various combinations of ownership-related variables, the three-component model presented in (Table15) proved most satisfactory.

Own1 – Impending generation transfer: The three strongest positive loadings on the component represent farmer's age, length of occupancy and impending generation change. The weak but positive loading of type of occupancy (x5) suggests that the farmer is still living on the farm, while the weak positive loading of current ownership (x2) suggests that some farms are already in the possession of heirs. The negative loading of vocational education in agriculture (x4maa) supports the fact that aged farmers are in question, as well as the fact that where ownership is by heirs a non-farming profession may be in question.

Own2 – Younger active ownership: The second component is characterised by the strong negative loading of non-farmer (x_{nonfm}), which is another way of saying a strong positive loading for farming profession! The component is also characterised by a strong positive loading of type of occupancy (x5), i.e. as the factors strengthens, it become more likely that the farm is occupied throughout the year. The other loadings support the interpretation of younger active ownership; the

Table 15. Varimax pc-model of farm ownership conditions

	Own1	Own2	Own3
x3	0.84	-0.13	0.07
x6	0.80	0.13	0.13
x19c	0.74	0.05	0.03
xnonfm	-0.02	-0.80	-0.34
x5	0.11	0.76	-0.42
x2	0.15	0.03	0.91
x4ag	-0.43	0.40	0.01
Variance explained, %	30.08	20.28	16.39
Eigenvalues	2.19	1.42	1.07

Where:

x2 – Current ownership

x3 – Owner's age

x6 – Length of present occupancy

x19c – Imminent generation change

x5 – Type of occupancy

x4ag – Agricultural education

xnonfm – greater part of farm income from non farm sources

x5 – Farm occupied throughout the year

weak but negative loading of age (x3) indicates a more youthful farmer, while length of occupancy (x6), weakly positive, suggest that the length of occupancy is relative short. Finally, the fairly strong positive loading of agricultural education (x4maa) supports the interpretation as it can be expected that younger generations of farmers have receive vocational education. (compare the negative loading of the same variable on component **Own1**).

Own3 – Deceased's estate: The very strong loading on this component of current ownership status (x2) means that as the component strengthens, the greater is the likelihood that the property is in the possession of heirs to a deceased farmer. The negative loading of type of occupancy (x5) also means that as the component strengthens the greater the likelihood that the farm is not occupied throughout the year. Both loadings support the interpretation that the component concerns the estate of a deceased farmer. The negative loading of the variable describing non-farm income (given a double negative interpretation) means that as the component strengthens it is more likely that the farm income is from farming. This is likely to be consequent upon the responder to the questionnaire. It is common practice in Finland for a deceased's estate to be managed by the heir who plans to continue agricultural husbandry. He/she nevertheless does not have legal ownership until he has settled claims by other heirs. The strong correlation of variables x_{nonfm} and x_{active} ($r=-0.409^{***}$) supports the interpretation.

The three ownership components therefore conveniently represent the life-cycle of farm ownership: **Own3** represents the embryonic start of a new farming generation, **Own2** represents the active middle period of productive agriculture, while **Own1** represents the sunset of the cycle with the retirement of the ageing farmer and the hope of the birth of a new cycle.

The causal effects of the ownership life-cycle, as represented by the above component solution, can be tested in several ways. As discussed in section 4.3, field afforestation variables can be added to the pc-solution, or correlation coefficients of component scores against these same variables can be estimated. Similarly, the afforestation variables can be regressed against component scores. Each approach has its advantages, but in order to standardise reporting, avoid confusion, only correlation analysis with probability estimates are reported here.

Variables representing the pre-conditions for and objections to field afforestation have been selected on the basis of the principal components analyses in Chapter 5, the variable receiving the highest loading on each component being selected. Additional variables concerning

planned field afforestation (x19g, x19f), and an attitudinal objection to field afforestation, (x38). The variable can be regarded as an *historical objection* to field afforestation, as a considerable proportion of the arable land in Finland has been cleared since Independence in 1917, i.e. within living memory.

Preconditions:

x29a (Affpos3) – Will afforest if agricultural support decreases

x29c (Affpos1) – Will afforest if the afforestation fee is paid in a lump sum

x29d (Affpos2) – Will afforest if short-rotation is in question

Objections:

x30c (Affneg3) – Good fields

x30e (Affneg2) – Leasing fields of greater benefit

x30f (Affneg1) – Emotional reasons

x38 – Fields should not be afforested as their clearance involved heavy work.

Planned afforestation:

x19f – Do you plan to afforest all your fields in next the 5 years?

x19g – Do you plan to afforest some of your fields in the next 5 years?

The correlation coefficients of the ownership component scores and dependent variables representing major pre-conditions or objections to field afforestation are now examined (Table 16).

The correlations of the **push and pull preconditions** (x29a, x29c) with the ownership components are very similar; both, after all, are economic pre-conditions. **Younger active farmers** (Own2) are seen to resist both the pre-conditions – the correlations are negative and significant. Farmers facing **retirement and generation transfer** (Own1) are mildly sympathetic to the push precondition (x29a), but react more significantly to the pull-motive (x29c) with its lump-sum payment. The latter is logical. Retiring farmers presumably have a short time horizon, and the lump sum form of payment is undoubtedly to be welcomed at the outset of retirement. The **short rotation option** (x29d) did not appeal to any of the ownership types in question, all correlations being insignificant. Similarly, where the farm is owned by heirs **Own3** (Deceased's estate), the uncertain ownership condition lead to weak decision making conditions, i.e. weak correlations.

Considering the **objections to field afforestation**, the variable concerning **good fields** (x30c) logically receives a fairly strong, positive correlation with **Younger active ownership** (Own2). Such an owner is clearly not interested in reducing his means of production.

The second "economic objection" relates to the **leasing preference** (x30e). This receives a strong, positive correlation with **impending**

Table 16. Correlations between ownership conditions and objections to, preconditions for and planned field afforestation

	Own1	Own2	Own3
x29a	0.09*	-0.16***	0.05
x29c	0.11**	-0.17***	0.03
x29d	-0.05	-0.03	0.05
x30c	-0.06	0.15**	-0.04
x30e	0.18***	-0.13**	0.05
x30f	0.12**	0.05	-0.09*
x38	0.15**	0.09*	-0.09*
x19f	0.23***	-0.22***	0.06
x19g	0.13**	-0.15**	0.04

*** p = 0.001 or less; ** p = 0.002–0.01; * p = 0.02–0.10

Where:

Own1 – Impending generation transfer

Own2 – Younger active ownership

Own3 – Deceased's estate

x29a – Will afforest if agricultural support decreases (push-motive)

x29c – Will afforest if the afforestation fee is paid in a lump sum (pull-motive)

x29d – Will afforest if short-rotation is in question (Reversibility pre-condition)

x30c – Good fields

x30e – Leasing fields of greater benefit

x30f – Emotional reasons

x38 – Fields should not be afforested as their clearance involved heavy work.

x19f – Do you plan to afforest all your fields in the next 5 years?

x19g – Do you plan to afforest some of your fields in the next 5 years?

generation transfer (Own1) suggesting a controlled cessation of agriculture, but fundamental objections to permanently closing the farm. This objection is significantly and negatively correlated with **younger active ownership**. The double negative (*negative* correlation of an *objection*) means that the younger active owners reject this alternative presumably because reductions of the means of agricultural production are not being considered.

Emotional objections (x30f) are positively and significantly correlated with **impending generation transfer** (Own1). The positive correlation is logical, as it can be expected that an ageing farmer has emotional ties to his fields from which he has obtained his living for the greater part of his life. **Heirs** (Own3) reject emotional objections – the correlation is significant and negative.

Historical objections to field afforestation represented by variable x38 closely follows the emotional objection x30f (above), and the

objection is significantly and positively correlated with **retiring farmers** (Own1). The variable is also positively and significantly correlated with **Younger active ownership** (Own2), which indicates the value placed on fields by active farmers. It should be noted that the difference between x30f and x38 is that the former is farm specific (owner's farm), whereas x38 refers to fields in general.

With respect to **planned afforestation**, intentions to afforest all fields (x19f) or selected fields or parts of fields (x19g) during the next five years receive predictably similarly coefficients, although for x19f the coefficients are generally larger. Farmers facing **generation transfer** (Own1) have afforestation plans (positive correlation coefficients) whereas **younger active owners** (Own2) do not (negative signs).

6.2 Farm structure and the decision to afforest fields

As in the case of ownership disturbance, farm structure has frequently been associated with field afforestation. Selby (1980a & 1980b) found a clear relationship between farm structure and field afforestation irrespective of the socio-economic environment of the locality in which the farms were located. For example, poor field location, size or quality directly effect field afforestation (Selby 1980). Similarly, Anttila (1990) and Mustonen (1990) have found structural attributes significant in the afforestation decision process (see Chapter 2).

A standard, if somewhat simplified, typological approach is employed. The advantage of using components analysis for this purpose is that the heterogeneous nature of the structural spectrum of a large number of farms can be simplified by seeking basic dimensions. In effect, however, few farms ever fit the "idealised" typological descriptions which result from such analyses. For this reason, the analysis is seen to supplement the farm type grouping already employed.

The four component solution present here (Table 17) is one of several which proved serviceable. It has been selected firstly because it formed the best relationship with the farm group classification, but it also most similar to a model constructed for Northern Finland (see Petäjistö & Selby 1994a).

Type1 – Large, efficient, grain oriented farming: The strongest loaded variables on this component concern the proportion of field area under grain and active farming. Further, large size (x13all) receives a strong positive loading and the dominance of fields (x11dfor) receives a significant positive loading, each of which support the inter-

pretation that the component concerns arable farming. The negative loading of the variable describing leasing, and the positive loading of the proportion of land under green fallow (x_{green}) each describe the effective use of the means of production. For example, there is no legal commitment to green fallow in the compulsory fallow legislation, but extra subsidies are derived from the green (non-food, or non-commercial¹¹) option; the farmers are optimising their perceived benefits. Livestock is loaded significantly but not very strongly, indicating an element of mixed farming, but this does not change the nature of the component.

Table 17. Varimax PC-model of farm structure

	Type1	Type2	Type3	Type4	
xgrain	0.79	-0.11	-0.16	0.08	
xactive	0.77	-0.11	0.14	0.40	
xletfld	-0.63	-0.01	-0.07	-0.31	
xgreen	0.56	0.01	0.07	-0.07	
x13all	0.54	-0.01	0.02	0.56	
x15c	-0.01	0.86	0.10	-0.01	
x15b	-0.10	0.84	0.03	-0.06	
x15a	0.13	0.15	0.73	-0.07	
x16	0.15	0.17	0.67	0.20	
xfldfor	0.21	0.14	-0.62	-0.03	
xsupp	0.03	0.01	-0.06	0.86	
xstock	0.25	-0.10	0.30	0.62	
Variance explained, %	19.83	12.93	12.77	14.64	T=60.15 %
Eigenvalues	3.24	1.77	1.25	0.96	

Where:

xgrain = Proportion of field area under grain

xactive = Is farm active or passive

xletfld = Proportion of fields let

xgreen = Proportion of field area under green fallow

x13all = Total field area

x15a = Forestry oriented towards wood production and sale

x15b = Forestry oriented towards recreation

x15c = Forestry oriented towards environmental and nature protection

x16 = Frequency of wood sales in last ten years

xfldfor = Field/forest area ratio

xsupp = Proportion of field area rented

xstock = Is there livestock husbandry?

11. e.g. certain legumes, as well as vegetables, etc for household consumption.

Type2 – Amenity forestry: The component is dominated by forestry variables. In this case the variables concern those forestry activities not related to commercial timber production; the variable describing wood sales (x16) is only weakly, although positively, loaded onto the component. Agricultural variables are largely weak and negative, suggesting that the forests belong to retired farmers or heirs. The term amenity is employed to define the non-commercial, nature-protection orientation of the component.

Type3 – Commercial forestry: This component also concerns forestry, but it clearly concerns commercial forestry. The two strong, positive loadings concern the production and sale of wood (x15a) and frequency of sale (x16). The presence of livestock is indicated (x_{stock}) with a moderate positive loading, indicating that commercial forestry is part of the farm enterprise. The strong negative loading of field to forest ratio indicates that the greater part of the farm is under forest.

Type4 – Large, expansive, livestock oriented farming: The strongest positive loadings concern the renting of supplementary land and livestock. Absolute size (x13all) is also strongly positive, together with the variable for active farming. Frequency of wood sales (x16) also receives a moderate positive loading.

The model conveniently falls into two agricultural and two forestry types. The two agricultural dimensions concern efficient large-scale arable farming, and expansive livestock farming, while the two forestry dimensions concern a dichotomy of commercial or non-commercial (alternative) management regimes.

The pc-solution complements the farm type classification already employed in the investigation, the latter being more definitive having been derived straight from the questionnaire. Naturally, the component representing **grain farms** related closely to the **arable farms** in the previous classification (the error being less than 4 % in the tabulation of **Type1** scores against the **Arable** class); a similar result holds for the **livestock farm** tabulated against **Type4** scores. The forestry-related components **Type2** and **Type3** also behave logically with respect to the farm classification. The Amenity forestry component (**Type2**) strongly associated with Uncultivated farms, but also to a lesser extent the Set-aside farms. The Commercial forestry component (**Type3**) has its strongest association with the livestock and active farms of the typological classification.

The dependent variables were alternately entered into the PC-solution, and the results checked for interpretational stability. Some distortion of the original PC-solution was observed, but initially it was not con-

sidered to be of consequence. On cross checking the loadings obtained by the dependent variables with the correlations obtained by these variables with the original component scores, mild interpretative deviations were noted. For safety, it was decided to rely only upon the correlation coefficients and their probabilities. In the event, this produced a greater number of significant relationships between component scores and dependent variables (Table 18).

Concerning the **preconditions for field afforestation**, significant negative correlations are found between both **push and pull pre-conditions** (x29a&c) and **large, efficient grain oriented farms** (Type1) and **large, expansive livestock oriented farms** (Type 4); i.e. the two components describing *active* agricultural dimensions. The correlations are slightly stronger for livestock farms suggesting that the rejec-

Table 18. Correlations between farm types and objections to, preconditions for and planned field afforestation.

	Type1	Type2	Type3	Type4
x29a	-0.17***	0.09*	0.11**	-0.19***
x29c	-0.15***	0.09*	0.06	-0.21***
x29d	0.04	0.08*	0.07	-0.10*
x30c	0.25***	0.02	-0.06	0.16***
x30e	-0.10*	-0.09*	-0.05	-0.16***
x30f	0.11*	0.01	0.05	0.05
x19f	-0.25***	0.04	-0.00	-0.23***
x19g	-0.21***	0.14**	0.10*	-0.24***
x38	0.13**	0.00	-0.04	0.04

*** p = 0.001 or less; ** p = 0.002–0.01; * p = 0.02–0.10

Where:

Type1 – Large, efficient, grain oriented farming

Type2 – Amenity forestry important

Type3 – Commercial forestry important

Type4 – Large, expansive, livestock oriented farming

x29a – Will afforest if agricultural support decreases

x29c – Will afforest if the afforestation fee is paid in a lump sum

x29d – Will afforest if short-rotation is in question

x30c – Good fields

x30e – Leasing fields of greater benefit

x30f – Emotional reasons

x38 – (Opinion) Fields should not be afforested as their clearance involved heavy work.

x19f – Do you plan to afforest all your fields in the next 5 years?

x19g – Do you plan to afforest some of your fields in the next 5 years?

tion of pre-conditions, whether push or pull, is stronger on livestock oriented than on grain oriented farms. The short rotation precondition (x29d) also significantly and negatively correlates with **large, expansive livestock oriented farms** (Type4), making the rejection of pre-conditions complete.

The **amenity forestry** component (Type2) correlates significantly and positively with all pre-conditions. This result indicates that amenity forestry can be interpreted as part of the running down process of the farm; i.e. agricultural cessation is imminent, and the farm will become an amenity to the owner. **Commercial forestry** interests, represented by Type3, also correlated positively with pre-conditions, but only the **push-motive** (x29a) receives a significant coefficient. This suggests that farmers will increase the role of commercial forestry and field afforestation if support for agriculture decreases. The result is logical, as field afforestation would contribute to a farm seeking to increase the commercial aspects of its forest enterprise (see e.g. Petäjistö *et al.* 1993, Mustonen 1993 & 1994).

As to **objections to field afforestation**, the **good field** objection (x30c) is significantly and positively correlated with both **grain** and **livestock farms** (Type1 & 4). Good fields are so obviously a prerequisite of good agriculture that little comment is required, except that the slightly weaker correlation with **livestock farms** (Type4) is logical as feed is often purchased, and fields are not so central to production.

On the other hand, the **leasing preference** (x30e) is negatively and significantly correlated with **grain farms** (Type1), suggesting a general reluctance to lease land, but this objection is strongest with respect to **livestock farms** (Type4), with which the negative correlation is highly significant. The importance of **amenity forestry** (Type2), also correlates negatively and significantly with the **leasing preference**. This indicates that while these farms may be in productive decline (see above) leasing fields is not generally being considered.

The **emotional objection** (x30f) is positively correlated with each typology component, but the only correlation of significance is that with **grain farms** (Type1). It would seem logical that grain farmers, depending as they do upon field crops, should have greater emotional ties to their fields than livestock farmers, where commercial feed plays a greater role in the farm economy. A similar explanation applies to the strong positive correlation between Type1 and **historical objections** to field afforestation (x38) and its weak performance with respect to the other farm types.

With respect to **planned afforestation** (x19f & x19g), the most striking (and obvious) elements are the strong negative correlations of these two variables with the two active farm types (**Type1** & **Type4**). Logically, productive farms should not be planning to afforest. Of particular interest is the significant and *positive* correlations between x19g (planned partial afforestation) and the two forestry related dimensions **Type2** (Amenity forestry) and **Type 3** (Commercial forestry). The result indicates the rationality of the farmers who are represented by these two components. Selective afforestation (x19g) is not only a means of reducing agriculture production (e.g. in the face of cessation), it may also contribute towards an improved forest management structure.

6.3 Management motivation and the decision to afforest fields

6.3.1 Management plans and field afforestation

In the theoretical frame, it was assumed that farmers were boundedly rational. Following work by Wolpert (1964), and support by work on rural entrepreneurs by Selby (1984, 1987, 1989) and Selby & Petäjistö (1992) it has been assumed that farmers attempt to optimise their utility, but do not necessarily try very hard. For this, and other reasons, management motives concerning the financial operations of farms have not been included in this investigation. The motives in question are related to qualitative decisions affecting the future status of the farm and which define the time horizon of decision making.

A number of variables were collected to examine motivation, the approach being that the stage of the life cycle of the farm would define the time horizon of the decision making. For this reason a five year time horizon was chosen; this being sufficiently short for realistic strategic planning, but long enough for circumstances to change. Thus, as both decisions and the advice required to make decisions are of central importance (see e.g. Selby & Petäjistö 1992) two models are presented. One concerns the assessment of future plans, while the second concerns a qualitative assessment of information required to carry out the farmer's strategy.

For the majority of the respondents, most of the options are considered to be unlikely (Table 19). While the majority (52 %) will not be facing ownership disturbances in the next five years, the most likely events seem to be if not the cessation of agriculture (22 %) or a reduction of agricultural production (12 %). Given the current uncertainty in the

Table 19. Five year management plans, by farm type, %

Farm management intentions	Uncultivated n = 17			Set-aside n = 120			Active n = 10			Arable n = 112			Livestock n = 182		
	no	cns	yes	no	cns	yes	no	cns	yes	no	cns	yes	no	cns	yes
x19a = Sell farm	53	29	18	67	24	9	50	40	10	72	21	7	82	12	6
x19b = Cessation of farming	18	76	6	22	45	33	30	40	30	57	23	20	67	18	15
x19c = Generation transfer	18	59	23	39	48	13	40	30	30	57	32	11	62	18	20
x19d = Expanding agricultural production	47	47	6	67	31	2	50	20	30	46	27	27	43	23	34
x19e = Contracting agricultural production	53	41	6	32	42	26	30	70	0	62	27	11	74	21	5
x19h = Purchasing forest land	41	47	12	59	34	7	60	30	10	54	31	15	49	29	22
x19i = Selling forest land	59	29	12	68	26	6	50	40	10	71	23	5	79	18	3

agricultural sector, it is perhaps surprising that 23 % of the farmers consider that they will actually *increase* agricultural production in the next five years. Only 8 % are planning to afforest all of their fields, and 23 % plan to afforest poor or isolated fields, as noted earlier. (The latter could have the effect of increasing farming efficiency and output rather than reducing it!)

Entering the management variables into principal components analysis resulted in the pc-solution presented in Table 20, the interpretation of which is as follows.

Man1 – Cessation and sale: The four strongest loadings on component Man1 concern the sale of agricultural or forestry land or the reduction or cessation of agricultural production. All other loadings are insignificant. No other interpretation is feasible.

Table 20. Varimax pc-model of farmers' management strategies.

	Man1	Man2*	Man3	Man4
x19a	0.84	-0.06	-0.11	0.05
x19i	0.78	0.15	0.05	-0.17
x19e	0.60	-0.13	0.39	0.20
x19b	0.57	-0.34	0.24	0.41
x19h	-0.00	0.86	0.10	0.07
x19d	-0.07	0.69	-0.31	-0.32
xnonfm	0.07	-0.28	0.74	-0.20
x21	0.07	0.30	0.66	0.33
x24	0.01	-0.05	-0.01	0.86
Variance explained, %	22.41	17.19	14.61	13.83
Eigenvalues	2.53	1.48	1.16	0.95

*Signs reversed.

Where:

x19a – Farm sale

x19b – Cessation of farming

x19d – Increase agricultural production (e.g. expanding or intensifying means of production)

x19e – Reduce agricultural production (e.g. selling or leasing fields, reducing capital stock, etc.)

x19h – Purchase forest land

x19i – Sell forest land

x21 – Economic orientation towards forestry

x24 – Voluntary set-aside agreement

Xnonfm – Farm incomes less than 50 % of total income

Man2 – Expansion of means of production: With signs reversed, the component's strongest positive loadings concern the purchase of forest land (x19h) and increasing agricultural production (x19d). The moderate but positive loading of an intention to orient towards forestry (x21) supports the earlier loadings. The weak but positive loading of x19i (selling forest land) seems an anomaly, but it can be logically equated with the expansion of farming activities.

Man3 – Production reorientation: The strongest loadings here concern the contribution of non-farm income (xnonfm) and an orientation towards forestry (x21). Moderately but positively loaded variables also indicate reorientation: i.e. agricultural production reduction (x19e) and the cessation of agricultural production (x19b), the latter being rather weakly loaded. Nevertheless, the component clearly concerns the process of change – and interpretation supported by the decreased dependence upon farm incomes (off-farm employment being part of the reorientation).

Man4 – Subsidised cessation of agriculture: Voluntary set-aside (x24) receives the strongest positive loading on the component. Moderate loadings are also received by the cessation of agricultural production (x19b) and an orientation to forestry (x21). The moderate negative loading of x19d (agricultural expansion) is logical and can be ignored. The component represents a logical strategy of a subsidised withdrawal from agricultural production. The component differs significantly from **Man1** by the weak or negative loadings of sale variables. Thus, this set of farmers wish to maintain possession of their property, and rationally seek compensation for declining farm incomes.

Entering the selected dependent variables into the pc-solutions led to instability with respect to components **Man3** and **Man4**, only correlation coefficients and their probabilities are therefore reported (Table 21).

Concerning the **pull- and push preconditions** (x29a&c), the pattern of correlations with **management components** are very similar, as expected. Thus, **cessation & sale** (Man1), **production re-orientation** (Man3) and the **subsidised cessation of agriculture** (Man4) bring about conditions likely to encourage field afforestation. In the case of **production reorientation** (Man3), the **afforestation premium** (x29c) would seem to be considered as a "start up" fund, while in the case of the **subsidised cessation of agriculture** (Man4), it is seen as either a "golden handshake" upon leaving agriculture, or as a pre-retirement bonus where retirement is imminent. Correlations between the push

and pull preconditions and the **expansion component** (Man2) are negative, as expected, but the correlations are surprisingly weak; strong negative correlations were expected here.

With respect to the **short rotation option** (x29d), correlations are positive for all management criteria components and significant for all but **Man3** (production reorientation). *Clearly, this pre-condition has to be taken seriously in future policy making.*

Objections to field afforestation receive surprisingly weak correlation coefficients. The **good field objection** (x30c) is significantly correlated with all the management criteria components: positively with the **expansion of agricultural means of production** (Man2) – a logical result – and negatively with **cessation & sale** (Man1), **production**

Table 21. Correlations between management strategies and objections to, preconditions for and planned field afforestation

	Man1	Man2	Man3	Man4
x29a	0.18***	-0.01	0.29***	0.28***
x29c	0.27***	-0.05	0.28***	0.24***
x29d	0.08*	0.08*	0.07	0.10*
x30c	-0.08*	0.08*	-0.27***	-0.15***
x30e	0.20***	-0.12**	0.05	-0.07
x30f	-0.10*	0.03	-0.06	-0.05
x19f	0.41***	0.06	0.33***	0.18***
x19g	0.21***	0.05	0.35***	0.24***
x38	0.01	0.05	-0.18***	0.10*

*** p = 0.001 or less; ** p = 0.002–0.01; * p = 0.02–0.10

Where:

Man1 – Cessation and sale

Man2 – Expansion of means of production

Man3 – Production reorientation

Man4 – Subsidised cessation of agriculture

x29a – Will afforest if agricultural support decreases

x29c – Will afforest if the afforestation fee is paid in a lump sum

x29d – Will afforest if short-rotation is in question

x30c – Good fields

x30e – Leasing fields of greater benefit

x30f – Emotional reasons

x38 – (Opinion) Fields should not be afforested as their clearance involved heavy work.

x19f – Do you plan to afforest all your fields in the next 5 years?

x19g – Do you plan to afforest some of your fields in the next 5 years?

reorientation (Man3) and **subsidised cessation of agriculture** (Man4) – highly significantly in the case of **Man3** and **Man4**. Thus, when management aims favour the reduction, termination or reorientation of agricultural production, the **good field objection** to field afforestation is often rejected.

The **leasing preference** (x30e) is positively and significantly correlated with **cessation and sale** (Man1), indicating a preference for field tenure change rather than field afforestation. The rationale for this may be economic, but it may also be emotional.

The latter argument is not supported by the negative correlation of **cessation and sale** with **emotional objections to field afforestation** (x30f). Indeed, the investigation as a whole, reveals that emotional objections are a stronger "dimension" that individual questions and correlations would suggest. This is discussed further in Chapter 8. In fact, the **emotional objection** correlates very weakly with all the other management components.

Variable, x38 concerns **historical objections to field afforestation** (as a general principle), and this is positively but weakly correlated with **cessation & sale** (Man1) and **expansion of agricultural means of production** (Man2), significantly and positively with **subsidised cessation of agriculture** (Man4) and very significantly and negatively with **production reorientation**(Man3). The two significant correlations are logical. **Production reorientation** involves rational decisions which do not take historical objection, into consideration, hence the negative sign. The positive correlation with **subsidised cessation of agriculture** reflects the *maintenance of agriculture values* by farmers who are nevertheless running down their operations.

Planned afforestation (x19f and x19g) correlate very significantly and positively with all management components except the **expansion of agriculture** (Man2), with which the correlation are still positive, but non significant. The result is entirely logical, given that the expansion of agriculture, by definition, is unlikely to favour field afforestation. Conversely, all other forms of management adjustment plans involve field afforestation plans. *It would seem that afforestation is being considered as a means of obtaining a pre-retirement "bonus", or a form of "start up" funding in the case of reorientation.*

6.3.2 Advisory requirements and the decision to afforest fields

The second set of information concerning management-related issues concerns farmers' qualitative assessments of their need for information with respect to the future strategy of the farm (Table 22). Contrary to

Table 22. Advisory requirements for future management plans, by farm types, %

Advice	Uncultivated n = 17			Set-aside n = 120			Active n = 10			Arable n = 112			Livestock n = 182		
	no	cns	yes	no	cns	yes	no	cns	yes	no	cns	yes	no	cns	no
x17a - concerning the management of agriculture change	6	65	29	12	32	56	10	30	60	10	20	70	12	16	72
x17b - concerning the search for a alternative forms of production , e .g. ecological farming	12	47	41	20	29	51	20	20	60	19	20	61	31	16	53
x17c - concerning the search for supplementary livelihoods	12	47	41	13	29	58	20	10	70	11	21	68	25	10	65
x17d - concerning increased economic benefits from forestry	12	35	53	10	21	69	0	30	70	10	16	74	13	7	80
x17e - concerning the farm's shift to forestry	12	35	53	19	35	46	10	40	50	33	25	42	35	16	49
x17f - concerning the cessation of farming	35	59	6	24	38	38	20	30	50	42	25	33	42	19	39
x17g - concerning farming for landscape management	18	41	41	21	27	52	20	30	50	29	25	46	25	25	46

recent investigations concerning the information acquirement of rural wood working entrepreneurs (many of whom were annexed to farms) (Selby 1989, Selby & Petäjistö 1992), farmers in the present investigation show, at least subjectively, greater interest in seeking advice. This is presumably a result of the changing and deteriorating socio-political environment for farming (e.g. Selby 1994).

Again, the advice-related variables were examined using principle components analysis (Table 23). An initial doubt that such a model might not produce meaningful dimensions was not supported. The solution is clear and logical, and the variance explained amounts to c.85 %

Adv1 – Agricultural cessation via forestry: The overwhelming loading is that of information concerning agricultural cessation (x17f). Interest in orientation towards forestry (x17e) receives a moderately strong loading, information concerning economic benefits from forestry receives a weak but negative loading. These farmers are seeking a controlled decline in farming without forfeiting their interest in forestry. This component correlates very strong and positively with both **cessation & sale** (Man1) (0.25***) and **subsidised cessation of agriculture** (Man4) (0.24***), a result which is entirely consistent with the component interpretations.

Table 23. Varimax PC-model of qualitative assessments of information requirements

	Adv1	Adv2	Adv3	Adv4
x17f	0.92	0.14	0.10	0.20
x17b	0.17	0.86	0.09	0.05
x17c	0.02	0.84	0.20	0.12
x17d	-0.05	0.21	0.88	0.20
x17e	0.49	0.12	0.74	0.04
x17g	0.20	0.12	0.18	0.95
Variance explained, %	19.22	25.56	23.48	16.62
Eigenvalues	2.59	1.03	0.80	0.67

Where:

- x17b – concerning the search for alternative production strategies
- x17c – concerning supplementary livelihood possibilities
- x17d – concerning increased economic benefits from forestry
- x17e – concerning the farm's shift towards forestry
- x17f – concerning the cessation of agriculture
- x17g – concerning landscape management farming

Adv2 – Economic diversification: The strong loadings of alternative production strategy related information (x17b) and information concerning the search for supplementary livelihoods (x17c) clearly indicates that the farmers here are seeking diversification strategies which include supplementary livelihoods (which may be farm-related or otherwise). The diversification interpretation is strengthened by the weak but not insignificant positive loading of forestry orientation-related information (x17e).

Adv3 – Shift to forestry: The component is very clear, these farmers seek information to assist them in their strategy to orient towards forestry and to optimise the economic benefits from forestry. Interestingly, this component correlates strongly and positively (0.28**) with **expansion of the means of production** (Man2).

Adv4 – Cessation of agriculture via landscape management: The very strong loading of information concerning landscape management clearly defines the component. Weak but positive loadings of agricultural cessation-related information (x17f) and information concerning economic benefits from forestry (x17d) suggest that these farmers are seeking ways for a controlled, i.e. subsidised, cessation of agriculture. The component compliments **cessation and sale** (Man1).

Adding the dependent variables to the above pc-solution had the effect of totally restructuring the components, often in unpredictable ways. Consequently, relationships between these advisory components and selected dependent variables are examined entirely on the basis of correlation coefficients and their probabilities (Table 24).

Perhaps the first thing that is noticeable from the correlations, is the very low correlation between the **objection variables** (x30c, x30e, x30f) and the **advisory components**, a fact which presumably helps to explain the erratic behaviour of the dependent variables when entered into the pc-solution. This would suggest that *as each advisory component strengthens, objections to field afforestation at least become suspended*; in other words, field afforestation becomes one option in an uncertain situation.

Supporting this argument is the significant negative correlation between **agricultural cessation via forestry advice** (Adv1) and the **good field objection** (x30c), and the positive and significant correlation between this objection and **economic diversification advice** (Adv2). Thus, the **good field objection** is *not* an objection in circumstances where farmers are seeking farm cessation, but it *is* in the case of agricultural diversification.

Table 24. Correlations between advisory requirements and objections to, preconditions for and planned field afforestation

	Adv1	Adv2	Adv3	Adv4
x28a	0.23***	0.04	0.22***	0.00
x29c	0.21***	-0.08	0.23***	0.10*
x29d	0.11**	0.12**	0.14**	-0.01
x30c	-0.16***	0.09*	0.01	0.06
x30e	0.06	0.05	-0.04	-0.03
x30f	-0.07	-0.00	-0.10*	0.02
x19f	0.23***	-0.10*	0.06	0.08*
x19g	0.22***	-0.00	0.14**	0.01
x38	-0.05	0.04	-0.12*	-0.04

*** p = 0.001 or less; ** p = 0.002–0.01; * p = 0.02–0.10

Where:

Adv1 – Agricultural cessation via forestry

Adv2 – Economic diversification

Adv3 – Shift to forestry

Adv4 – Cessation of agriculture via landscape management

x29a – Will afforest if agricultural support decreases

x29c – Will afforest if the afforestation fee is paid in a lump sum

x29d – Will afforest if short-rotation is in question

x30c – Good fields

x30e – Leasing fields of greater benefit

x30f – Emotional reasons

x38 – (Opinion) Fields should not be afforested as their clearance involved heavy work.

x19f – Do you plan to afforest all your fields in the next 5 years?

x19g – Do you plan to afforest some of your fields in the next 5 years?

The significant negative correlation between **emotional objections** (x30f) and **shift to forestry advice** (Adv3) is also logical, if the orientation to forestry is a commercial re-orientation, field afforestation would assist the extension of forestry operations.

Concerning the **precondition for field afforestation**, the strong positive correlations between the advisory components **cessation via forestry advice** (Adv1) and a **shift to forestry advice** (Adv3) and the **push and pull preconditions** (x29a & x29c) are entirely logical given the above discussion concerning objections to field afforestation. Agricultural cessation via forestry and forestry orientation naturally leading to a sympathy towards the pre-conditions for field afforestation.

The **short-rotation option** (x29d) also proves to be a significant alternative with respect to farmers' management strategies, and it correlates positively and significantly with **Adv1**, **Adv2** and **Adv3**, of which the most interesting is **economic diversification advice** (Adv2); i.e. *many farmers seriously consider short rotation forestry as part of a diversification strategy*.

Planned afforestation variables (x19f & g) are highly correlated with **cessation via forestry advice** (Adv1), as expected on the basis of the results for the preconditions. **Partial afforestation** (x19g) is significantly and positively correlated with the **shift to forestry advice** (Adv3), again as expected. **Total afforestation** (x19f) is significantly and negatively correlated with **economic diversification** (Adv2), which is also to be expected. In this respect, it should be remembered that **economic diversification advice** (Adv2) is strongly and positively correlated with the **short rotation option** (x29d). This suggests that field afforestation and short rotation forestry are regarded as two entirely different processes. This investigation also takes the same view: afforestation terminates the Field as a place, short rotation tree crops can be seen as an extension of farming and the integrity of the Field as a place is preserved.

7 Farmers' attitudes and values and the decision to afforest fields

7.1 Farmers' agricultural values

The frame of reference established that values, e.g. ties to place, etc., cannot be lightly rejected as factors affecting decision making, and the contention has received support from the analysis so far. In this Chapter, farmers' values and attitudes are examined in more detail.

Two sets of variables were acquired specifically for the modelling of attitudes and values. The first set concerns aspects of farmers' agricultural values as expressed by responses to a given set of propositions. The second set concerns farmers' attitudes to changing agricultural policies expressed by questions eliciting their own preferred response to "agricultural overproduction".

First, the set of attitude variables concerning farmers' responses to general propositions (Table 25): these were selected to try and reveal certain values concerning agriculture and the rural environment, the place of family farming, and attitudes concerning the intrinsic value of the fields.

The table reveals the problem of skewness. On the other hand, the nature of the propositions were often such that it would have been very difficult to elicit normal distributions. The problem is more serious when the same variables are applied to multivariate analysis, which assumes a normal distribution. As noted elsewhere, however, the analytical methodology has to be tempered with adherence to theoretical expectations, and an understanding of the implications of the ways in which variables behave in the context of analytical situations, and so the variables were employed despite their skewness.

The results of Table 25 are interesting, especially as they reveal the importance of emotional ties to the land (x43, x48, x49 & x50), the importance of family farming (x43, x44), and the way in which farmers value the environment (x39, x40 - x43, x47). Thus, family farming gains considerable sympathy. The reasons for this are deeply imbedded in Finland's socio-economic and political history (see e.g. Granö 1952, Palomäki 1960, Torvela 1990).

Environmental issues also draw interesting responses. On the basis of questions x43 and x47 it is clear that many farmers interpreted the terms *environment* and *landscape* in the same way (the researchers

Table 25. Farmers' responses to certain propositions concerning agricultural values, all farms, %

	disagree	cannot say	agree	total n = 441
x35 – "The receipt of state aid limits landowners' ownership rights and independence".	36	27	37	100
x36 – "It is correct that the State monitors and controls the ownership and use of agricultural land".	55	19	26	100
x37 – "Wood production is more profitable than agriculture".	49	37	14	100
x39 – "Agricultural and environmental policy should not be mixed together".	26	18	56	100
x40 – "The demands of agricultural production can be compromised for the benefit of nature conservation".	24	22	54	100
x41 – "Today, there is too much talk about overproduction".	12	12	76	100
x42 – "Modern agriculture is too intensive".	31	16	53	100
x43 – "The agricultural landscape is central to our cultural heritage".	2	10	88	100
x44 – Family-farming is more important than food production efficiency".	11	18	71	100
x45 – "Family farming should be supported, even though this means higher food prices."	16	16	67	100
x46 – "Agriculture should be made to compete freely, just as any other enterprise".	30	23	47	100
x47 – "Agriculture and environmental management are the same thing".	9	17	74	100
x48 – "I consider my fields to be part of my family heritage".	11	13	76	100
x49 – "For me, ownership of fields has value in itself".	14	19	67	100
x50 – "My fields present to my heirs' links to their family roots".	10	24	66	100

had ecological issues in mind when using the term *environment*). Nonetheless, 56 % of the farmers were of the opinion that environmental and farming policies should *not* be mixed. Conversely, 54 % of the farmers agreed that the demands of agricultural production can be compromised in favour of the environment. Similarly, 53 % agreed that farming is too intensive, although this response may be related to other issues.

Concerning agriculture support and the status of agriculture, nearly half of the farmers were of the opinion that agriculture should be made to compete freely. Further, as many as 37 % agreed that the receipt of state supports reduces landowners' rights and independence. However, 76 % of the respondents believed that there is too much talk about agricultural over production.

Table 26. Varimax pc-model of farmers' values

	Val1	Val2	Val3	Val4
x48	0.73	-0.13	0.10	0.10
x47	0.70	0.05	-0.01	0.16
x50	0.70	-0.16	0.13	0.12
x43	0.62	0.14	-0.08	0.11
x42	-0.06	0.75	0.11	0.02
x40	0.02	0.74	-0.12	0.05
x35	-0.01	0.13	0.67	0.09
x39	0.09	-0.34	0.60	0.09
x46	-0.01	0.37	0.53	-0.45
x45	0.18	0.01	-0.02	0.82
x44	0.29	0.32	0.12	0.70
x41	0.15	-0.19	0.41	0.51
Variance explained, %	17.13	13.14	11.04	14.28
Eigenvalues	2.74	1.58	1.27	1.08

Where:

x35 – "The receipt of state aid limits landowners' ownership rights and independence".

x39 – "Agricultural and environmental policy should not be mixed together".

x40 – "The demands of agricultural production can be compromised for the benefit of nature conservation".

x41 – "Today, there is too much talk about overproduction".

x42 – "Modern agriculture is too intensive".

x43 – "The agricultural landscape is central to our cultural heritage".

x44 – Family-farming is more important than food production efficiency".

x45 – "Family farming should be supported, even though this means higher food prices."

x46 – "Agriculture should be made to compete freely, just as any other enterprise".

x47 – "Agriculture and environmental management are the same thing".

x48 – "I consider my fields to be part of my family heritage".

x50 – "My fields present to my heirs links to their family roots".

The set of value variables produced both four and five component models with acceptable interpretations. The four-component model presented here (Table 26) was preferred because of its compatibility with a model constructed for Northern Finland (see Petäjistö & Selby 1994a).

Val1 – Traditional, home-oriented values: The four strongest loadings on the component concern either landscape and environment management (x47, x43) or the field as part of the family tradition (x48, x50). The importance of family farming (x44) is also weakly, but significantly loaded onto the component. The interpretation is clear; family and field values are linked with the questions of the environment of the home area (stewardship). The component concerns the essence of rural values.

Val2 – Eco-farming values: The two strongest loadings (x42, x40) respectfully concern the need to compromise the demands of agricultural production in the interest of nature, and the fact that modern agriculture is too intensive. Both suggest ecological awareness. Support the green interpretation, x39 (agricultural and environmental policies should not be mixed) receives a significant negative loading. It is also not illogical that agreement is found with the proposition that family farming is more important than farming efficiency (x44) is significantly and positively loaded on the component, as it clearly supports de-intensification. Less clear, however, is the loading of x46 (Agriculture should be made to compete freely...), a proposition which contains implications of efficiency and commercialism. A solution was found with reference to other component models (not reported here), which confirmed that environmental values and free competition formed a persistent dimension. Consequently, the component is considered to represent farmers' sympathies towards a more ecologically oriented form of enterprise free from the distorting influence of subsidies which encourage intensive methods.

Val3 – Free enterprise values: This component is the inverse of Val2, in that intensive production and enterprise are stressed in favour of environmental values. The three strongest loadings, in declining order, concerning objections to restrictions on freedom (x35), implied objections to attempts to mix environmental and agricultural policy (x39) and belief that agriculture should compete freely as any other enterprise (x46). Variable x41 (objections to talk of over-production) is also fairly strongly loaded on the component. The attitudinal dimension in question clearly implies a sympathy for free enterprise and reduced state intervention. On the other hand, the component could be interpreted as "anti-establishment"!

Val4 – Protectionist values: Support for family farming (x45) and the implied unconditional value placed on family farming (x44) are linked here with the belief that there is too much talk about over-production (policy responses to which threaten the future role of family farms) (x41). These positive loadings are supported by the strong negative loading of x46 (agriculture should compete freely), making the *protectionist* interpretation straightforward.

The model solution is both serviceable and interesting. The four dimensions intuitively "feel right", given the recent public debate on the future of agriculture. **Val1** representing the essence of rural values is for all that not so reactionary as **Val4**, which seeks to maintain the *status quo* via continued protectionism. **Val2** seems to represent a new, ecological orientation to agriculture, whereas **Val3** represents strong entrepreneurial values .

7.2 Attitudes concerning solutions to agricultural overproduction

The questions concerning farmers' solutions to agricultural overproduction were aimed at revealing farmers' specific attitudes to farming (Table 27). The questions were nevertheless normative in that they did not ask whether the respondent him/herself would adopt the agricultural reduction policy alternative in question. Not unexpectedly, farmers' views concerning solutions to over production were oriented towards *productive* solutions, that is to say solutions which maintain the viability of farming as a way of life.

The overwhelming preference was for forestry to be made more profitable: a view which is in line with current thinking in rural policy (Rural Policy Committee 1992; 60–62). Increasing the production of non-food produce and the rather abstract concept of "landscape farming" were also strongly favoured. Nearly half of the farmers also considered that the intensity of agricultural production should be reduced.

Field afforestation as a solution to over production received a more ambiguous response, with very nearly a third for and a third against, the final third not being able to say. Passive farms demonstrated a slightly more favourable disposition towards field afforestation than active farms, but the difference is small. The question itself, it has to be remembered, was normative in tone; i.e. it did not require the farmer to commit *his* farm to field afforestation.

Not unexpectedly, objections to the solutions which would upset the current *status quo* in agriculture were generally rejected. Compulsory

Table 27. Farmers' attitudes concerning solutions to agricultural overproduction

Solution proposed	Uncultivated n = 17			Set-aside n = 120			Active n = 10			Arable n = 112			Livestock n = 182		
	disag	cns	agree	disag	cns	agree	disag	cns	agree	disag	cns	agree	disag	cns	agree
x34a - Reduce agricultural intensity	18	47	35	16	24	60	10	10	80	32	31	37	35	18	47
x34b - Reduce state support for agriculture	23	29	48	23	32	45	50	0	50	46	29	25	59	16	25
x34c - Forestry should be made profitable	6	29	65	3	20	77	10	30	60	3	20	77	2	15	83
x34d - Fields should be afforested	12	35	53	22	32	46	60	20	20	37	29	34	39	26	35
x34e - Increase compulsory set-aside	41	47	12	33	32	25	60	30	10	45	27	28	55	24	21
x34f - Voluntary shift to non-food production, etc.	12	53	35	9	37	54	20	10	70	13	29	58	12	26	62
x34g - Reduce farm numbers	35	41	24	36	30	34	50	20	30	43	29	28	41	26	33
x34h - Increase landscape farming	18	53	29	9	37	54	10	40	50	20	28	52	14	30	56

fallow was very unpopular, while subsidy reductions and a decrease in the number of farms were also unpopular solutions. Differences between passive and active farms, as well as farms groups, were again small. Thus, the often held view that active and passive farmers behave differently when considering field afforestation is not supported, at least not with respect to *objections* to field afforestation. That having been said, it must be recalled that when considering *pre-conditions* for field afforestation, passive farmers showed greater enthusiasm than active farmers.

Entering the variables into principal components analysis resulted in a five-component pc-model (Table 28).

Att1 – Agricultural contraction-maintained intensity: Field afforestation (x34d), farm number reduction (x34g) and compulsory set-aside (x34e) each gain strong or fairly strong loadings on this component clearly suggesting that agriculture contraction is the preferred opinion. Weak, but positive loadings for non-food production (x34f) and reduced agricultural subsidies (x34b) give support to the agricultural contraction interpretation. On the other hand, reducing agricul-

Table 28. Rotated pc-model of farmers' response to agricultural overproduction

	Att1	Att2	Att3	Att4	Att5
x34d	0.83	0.08	0.19	0.10	-0.02
x34g	0.67	0.11	-0.24	-0.22	0.41
x34h	0.03	0.89	-0.04	-0.03	0.14
x34f	0.22	0.60	0.20	0.35	-0.32
x34a	-0.14	0.17	0.78	-0.18	0.10
x34e	0.33	-0.16	0.67	0.09	0.13
x34c	-0.01	0.05	-0.09	0.94	0.04
x34b	0.12	0.03	0.24	0.06	0.87
Variance explained, %	16.51	15.27	15.77	13.80	13.59
Eigenvalues	1.78	1.36	1.11	0.95	0.78

Where:

x34a – Reduction agricultural intensity

x34b – Reduce State support for agriculture

x34c – Forest should be made more profitable

x34d – Fields should be afforested

x34e – Increase compulsory set-aside

x34f – Voluntary shift to non-food products (short-rotation trees and other bioenergy crops, agrofibres, etc.)

x34g – Reduce the number of farms

x34h – Increase landscape management farming

tural production intensity received a negative loading, albeit a rather weak one. The group of farmers therefore prefer to maintain current production methods rather than adopt less intensive practices.

Att2 – Landscape management via alternative production: Landscape management farming (x34h) and non-food production (x34f) receive very strong and strong loading respectively, suggesting an attitude supporting farming by whatever means. Reducing agricultural intensity and reducing the number of farms are alternatives which are also weakly loaded onto the component suggesting that the component concerns farmers' who realise readjustment in agriculture has to be made. The weak, but significant, negative loading of increased set-aside supports the interpretation. Set-aside fields are non-productive, and can also be unsightly as a landscape element.

Att3 – Production intensity reduction: Reduced agricultural production intensity (x34a) and more compulsory set-aside (x34e) receive the strongest loadings on the component. The production intensity reduction interpretation is therefore clear. Support is gained from the weak but positive loading of reduced agricultural subsidies (x34b) (i.e. subsidies are a contributory factor with respect to the intensity of production), and of increased non-food production (which is often, not necessarily correctly, considered to be less intensive): Field afforestation also gains a weak but positive loading on this component. Interestingly, farm number reduction (x34g) gains a significant negative loading. Thus, production intensity reduction is seen as an alternative to, and in preference of, a reduction in the number of farms. The component therefore contains an element addressing rural continuity.

Att4 – Strong shift in production The component is dominated by the very strong positive loading of the "forestry should be made profitable" alternative (x34c), which is supported by the fairly strong loading of the non-food alternative (x34f). The component can therefore be regarded as representing a strong shift in farms' production structures. The negative loadings of the reduction in farm numbers (x34g) and reduced production intensity (x34a) suggests that the reorientation is at least partly motivated by a desire to maintain the role of agriculture in the countryside.

Att5 – Subsidy reductions and fewer farms The component is strongly characterised by the strong loading of reduction of state subsidies to agriculture (x34b) and to a lesser extent by the reduction in the number of farms (x34g). The component clearly represents a somewhat "hard-line" opinion that agriculture has to be cut down to size. The motive is unclear: the significant negative loading of non-food production suggests a somewhat conservative attitude to produc-

tion, although landscape management and compulsory set-aside receive weak but positive loadings. Could the motive be self-preservation? – the reaction of farmers who are already efficient and competitive?

7.3 Relationships between attitudes and values

By their very nature, it can be expected that the attitude and value models presented above will have many common features; both address a similar field of interest. In order to understand their inter-relationship, Pearson correlation and probability matrices were calculated for a data-set containing **Att1–5** and **Val1–4**. The results are simplified in Table 29: components in the same model naturally have zero correlations, this being a feature of the method. The table shows that certain dimensions are repeated in each model. The most systematic similarity being **Eco-farming**(Val2) which correlates very strongly with **landscape management via alternative production** (Att2) and **Production intensity reduction** (Att3). Similarly, **protectionist values** (Val4) correlates strongly but negatively with **Subsidy reductions and fewer farms** (Att5), and also with **Agricultural contraction** (Att1). **Free enterprise agriculture** (Val3) correlates negatively with **Landscape management** (Att2) but positively with **subsidy and farm number reduction** (Att5). Finally, **traditional, home-oriented values** (Val1) correlates positively with **Landscape management** (Att2). The results are logical and predictable. One or other of each pair must be chosen for inclusion in further analyses.

Table 29. Significant correlations between attitude and value components

	Val1	Val2	Val3	Val4
Att1				-0.16**
Att2	0.18**	0.37***	-0.17**	
Att3		0.48***		
Att4				
Att5		0.16**	0.17**	-0.32***

*** p = 0.001 or less; ** p = 0.002–0.01

Val1 – Traditional, home-oriented values

Val2 – Eco-farming values

Val3 – Free enterprise values

Val4 – Protectionist values

Att1 – Agricultural contraction/maintained intensity

Att2 – Landscape management via alternative production

Att3 – Production intensity reduction

Att4 – Strong shift in production

Att5 – Subsidy reductions and fewer farms

7.4 Attitudes, values and the decision to afforest fields

Attitudes and values are now examined with respect to the dependent variables which have been used to represent various aspects of farmers' preconditions for or objections to field afforestation. In the case of the policy-related **attitudes**, adding the dependent variables alternately into the pc-model produce sufficient distortion of the original solution to warrant the rejection of the outcome in favour of correlation coefficients between the original component scores and the dependent variables (Table 30).

With respect to pre-conditions for field afforestation (x29a & x29c), correlate strongly and positively with **agricultural contraction/maintained intensity** (Att1). The attitude represented by this component

Table 30. Farmers' policy-related attitudes and field afforestation

	Att1	Att2	Att3	Att4	Att5
x29a	0.25***	0.07	0.20***	0.09*	0.06
x29c	0.25***	0.06	0.18***	0.12**	0.17***
x29d	0.16***	0.08*	0.10*	0.07	0.02
x30c	-0.13**	0.04	-0.13**	0.05	-0.17***
x30e	0.04	-0.04	0.05	-0.05	-0.06
x30f	-0.21***	0.00	-0.02	-0.05	-0.11*
x19f	0.23***	-0.07	0.18***	-0.07	0.10*
x19g	0.26***	0.01	0.17***	0.04	0.16***
x38	-0.35***	-0.04	-0.08	-0.02	0.12**

*** p = 0.001 or less; ** p = 0.002–0.01; * p = 0.02–0.10

Where:

Att1 – Agricultural contraction/maintained intensity

Att2 – Landscape management via alternative production

Att3 – Production intensity reduction

Att4 – Strong shift in production

Att5 – Subsidy reductions and fewer farms

x29a – (Affpos3) Will afforest if agricultural support decreases

x29c – (Affpos1) Will afforest if the afforestation fee is paid in a lump sum

x29d – (Affpos2) Will afforest if short-rotation is in question

x30c – (Affneg3) Good fields

x30e – (Affneg2) Leasing fields of greater benefit

x30f – (Affneg1) Emotional reasons

x38 – (Opinion) Fields should not be afforested as their clearance involved heavy work.

x19f – Do you plan to afforest all your fields in next the 5 years?

x19g – Do you plan to afforest some of your fields in the next 5 years?

can be regarded as reflecting traditional values in that the intensity of production should be maintained. Because field afforestation policy is aimed at achieving this end, both the preconditions are supported. Of greater interest is, perhaps, the fact that short-rotation forestry is also strongly and positively correlated with **Att1**. Thus, all preconditions for field afforestation gain approval.

Att3 (production intensity reduction) presents an alternative approach to agricultural over-production, one which is virtually opposite to that proposed by **Att1**. Nevertheless, it too correlated strongly and positively with both the push and pull preconditions for field afforestation, as well as with the short-rotation option (x29d), although less strongly. **Strong production reorientation (Att4)** and subsidy and farm reduction (**Att5**) correlate strongly with the **pull-motive** (x29c), less so with the **push-motive** (x29a), and not at all with the **short-rotation option** (x29d). The **landscape management and alternative production** dimension (**Att2**), as might be expected, correlates positively with **short-rotation option**. The result also indicates the stability and logicity of the component structure and its interpretation.

Objections to field afforestation are not so frequently or strongly correlated with agricultural attitudes than is the case with preconditions. The strongest correlations, both negative, concerning the **good fields objection** (x30c) and the **emotion objection** (x30f); the former correlating with **subsidy and farm number reductions (Att5)** and the latter with **agricultural contraction/maintained intensity (Att1)**. The **good fields objection** (x30c) is also significantly and negatively correlated with **Att1** (agricultural contraction/maintained intensity) and **Att3** (production intensity reduction). It would therefore seem that, as elsewhere in this investigation, good fields do not necessarily present a major objection to field afforestation.

Emotional objections to field afforestation (x30f) and **historical objections** (x38), based on the same rationale, are both strongly and negatively correlated with **agricultural contraction/maintained intensity (Att1)** and **subsidy reductions and fewer farms (Att5)**. Objections to field afforestation are here overruled in favour of rational agricultural policy solutions to over-production. Afforestation is planned by those supporting agricultural attitudes represented by **Att1**, **Att3** and **Att5**, each of which concern production reduction policies. The result is entirely logical: farmers are practising what they preach.

Turning to the set of general values (**Val1-4**), entering the dependent variables alternately into the pc-solution did not bring about changes in the model's interpretation; i.e. the component solution proved to be

very stable. Comparing the loadings with the correlation coefficients of the dependent variables and the component scores revealed very similar results, with the loadings seemingly "exaggerated" in those cases where the correlations were also very strong. This contrasts with the policy-related attitude model, which was very unstable. To be consistent, however, only the correlation coefficients and their probabilities are reported (Table 31).

There is a close parallel between the **push and pull pre-conditions** in terms of both significance and sign. The most interesting feature of the result is, perhaps, the *positive* correlations between **eco-farming values** (Val2) and the pre-conditions. All other **value** components are negatively correlated with the preconditions. The explanation of the positive signs with respect to **eco-farming values** is not immediately clear. Given the fact that **Val1** and **Val4** concern traditional farming

Table 31. Correlations between value components and objections to, preconditions for and planned field afforestation.

	Val1	Val2	Val3	Val4
x29a	-0.11*	0.21***	-0.06	-0.08*
x29c	-0.13**	0.23***	-0.02	-0.12**
x29d	-0.01	0.13**	-0.07	-0.12**
x30c	0.26***	-0.19***	0.08*	0.18***
x30e	0.05	0.03	0.11*	0.02
x30f	0.33***	-0.09*	0.14**	0.07
x19f	-0.18***	0.19***	0.03	-0.15**
x19g	-0.11*	0.21***	-0.06	-0.18***
x38	0.30***	-0.09*	0.33***	0.24***

*** p = 0.001 or less; ** p = 0.002–0.01; * p = 0.02–0.10

Where:

Val1 – Traditional, home-area oriented values

Val2 – Eco-farming values

Val3 – Free enterprise agriculture

Val4 – Protectionist values

x29a (Affpos3) – Will afforest if agricultural support decreases

x29c (Affpos1) – Will afforest if the afforestation fee is paid in a lump sum

x29d (Affpos2) – Will afforest if short-rotation is in question

x30c (Affneg3) – Good fields

x30e (Affneg2) – Leasing fields of greater benefit

x30f (Affneg1) – Emotional reasons

x38 (Opinion) – Fields should not be afforested as their clearance involved heavy work.

x19f – Do you plan to afforest all your fields in next the 5 years?

x19g – Do you plan to afforest some of your fields in the next 5 years?

values, their negative correlations with the preconditions are understandable. **Eco-farming values** represent radical – non-traditional attitudes, and so these farmers may be more willing to accept field afforestation. On the other hand, there is reason to believe that **environmentally (ecological) farming** is associated with the decoupling of farms from normal commercial production prior to cessation. If this is the case, the positive correlations between **eco-farming values** and the **pre-conditions** for field afforestation are logical.

Objections to field afforestation are characterised by the strong positive correlations of each value dimension with the good fields objection (x30c). The result is entirely as expected.

Leasing fields as an alternative to field afforestation (x30e), while positively correlated with all values, is only significantly correlated with **free enterprise agriculture** (Val3). The result is logical, as leasing is an economic alternative to field afforestation. It is also an alternative in which fields remain intact; a point which may be particularly pertinent when concerning farmers' values. Support for this contention is provided by the positive and significant correlation of **free enterprise agriculture** (Val3) with **emotional objections** (x30f). The **emotional objections** variable also correlates strongly and positively with **traditional, home-area values** (Val1). The **emotional objection** variable (x30f) also correlates significantly and negatively with **eco-farming values** (Val2), which supports the positive correlations between **Val2** and the pre-conditions for field afforestation, discussed above.

The behaviour of the **historical objection** (x38) again closely follows that of the emotional objection (x30f), but the correlations are stronger. Thus **historical objections** are associated with the **free enterprise farming values** (Val3), which is perhaps a little surprising, and with **Protectionist values** (Val4), which is not.

Planned afforestation (x19f and x19g) follows the pattern set by the preconditions (x29a and x29c). This suggests that the questionnaire was filled out very logically by the respondents, as testified by this consistency of interpretation.

7.5 The intrinsic value of field ownership and the decision to afforest fields

7.5.1 Modelling field ownership in a time perspective

Throughout the analysis, qualitative values and attitudinal attributes have been demonstrated to play a clear, if not particularly strong role in the formation of objections to field afforestation. When tested indi-

vidually, variables addressing emotional objections to field afforestation have not always been found to be significant, but when brought together, e.g. by principal component analysis, these emotional or value attributes clearly formed recognisable dimensions which, in turn, significantly related to the formation of pre-conditions or objections to field afforestation.

In particular, the model concerning farmers' attitudes presented in section 7.3, clearly demonstrated significant relationships between field afforestation and certain attitudinal dimensions. It was found, for example, that **traditional, home area values** (component **Val1**) has a negative effect on farmers' willingness to afforest fields. The result is in accord with the hypothesis that ties to place should negatively affect willingness to afforest fields, and this support encourages further investigation.

The value model contained a **past-future** dimension represented by variables x48 (*I consider my fields to be part of my family heritage*) and x50 (*My fields present to my heirs links to their family roots*). Other **place-value** related variables are available, notably farmers' intrinsic value of owning fields today (x49), the length of time the farm had been in the farmers' family (x7), the value of the agricultural landscape as a central element of cultural heritage (x43), and indirectly, the intrinsic value of family farming (x44)¹². Variables x7 and x49 are new to the analysis. The environmental management variable (x47) which was strongly loaded on **Val1** is omitted as it is not directly concerned with intrinsic value.

The analysis which follows is not without its problems. First, the normality of the variables leaves much to be desired, as by their very nature answers to some questions were bound to be skewed. Secondly, the method of starting with basic components solutions and then adding dependent variables in the manner of a regression analysis has its own weaknesses, as discussed in section 5.3. Thirdly, more variables concerning place- and time-related values would have been desirable. As with many socio-economic investigations, the ways in which the investigation developed once the empirical analyses was begun were not fully foreseen. For example, attributes dealing with ties-to place are under represented in the data set. As result, of these shortcomings, the interpretations of the components, and especially the behaviour of the added dependent variables, is at best intuitive, guided by the qualitative arguments presented in the frame of reference, and perhaps ultimately speculative! Nonetheless, the results are sufficiently interesting

12. As noted elsewhere, family farming is very much a way of life in Finland, with strong cultural and political affiliations.

to warrant discussion. Loadings are specific and the degrees of variance explained are more than satisfactory for two-component solutions. Further, and most importantly, the results are supported by the detailed discussion on social space and place in the frame of reference (section 4.5).

Several combinations of the field-value variables x48, x49 & x50 were employed in the exploratory analyses in order to assess whether the historical, present or future implications of the intrinsic value of field ownership could be determined. The most successful solutions involved a **past-present** time dimension based on x48 & x49, and a **present-future** time dimension based upon x49 & x50.

7.5.2 Past-present intrinsic field ownership value

PP1 – Family farming and the intrinsic value of place continuity:

This dimension (Table 32) is considered to represent family farmers' ties to place. As the component strengthens, attitudes supportive of family farming increase (x44) as does the belief that the agricultural landscape is symbolic of cultural heritage (x43). This latter loading is important because "place" is value-free until given explicit or implicit value by individuals or communities (see discussion section 4.5) – an argument which is central to the interpretation of the component model as a whole. This is because while several of the variables con-

Table 32. Varimax pc-solution concerning ties to place (past-present time dimension).

	PP1	PP2
x44	0.76	0.15
x49	0.63	0.44
x43	0.62	0.07
x7	0.19	0.82
x48	0.48	0.69
Variance explained, %	33.16	27.99
Eigenvalues	1.93	1.12

Where:

- x7 – Time the farm has been in the same family
- x43 – The agricultural landscape is central to the cultural tradition
- x44 – Family farming is more important than production efficiency
- x48 – My fields are important to me as part of my family's heritage (inheritance)
- x49 – Ownership of fields has, for me, value in itself
- x50 – My fields are my heirs' links to their family roots.

cern *ownership*, it is important that ownership is not interpreted in the narrow meaning of mere legal possession. *Ownership* is given an intrinsic value which can justifiably be linked with *place*. However, as noted at the outset, more variables should ideally be available. Both the past and present oriented value dimensions (x48, x49) are strongly loaded onto this component; the historical value (x48) being slightly weaker than present value (x49); a result which suggests that family-farming values are less oriented to the past than to the present, but the discussion will return to this point.

PP2 – Field ownership as family heritage: This dimension is dominated by the strong positive loading of x7 representing the length of time the farm has been in the present farmer's family (i.e. anything up to 400 years). Variable x48, representing the importance of the field as part of the family's heritage, is also strongly loaded on the component. Less strongly, but nevertheless significantly, loaded on the dimension is x49, representing the present intrinsic value of field-ownership. The cultural heritage variable (x43) is only weakly positive. The importance of family farming (x44) is weakly but negatively loaded; i.e. as the factor strengthens, support for family farming weakens. The component is considered to express land ownership value as part of family heritage, i.e. value of ownership derived from a long history of ownership. The interpretation is supported by the fact that the historical element (x48) is stronger than x49 (present intrinsic value).

The fact that the variables representing family-farming values (x44) and length of ownership (x7) are so strongly differentiated by the two components assists the interpretation of the pc-solution. The behaviour of the value-time variables (x48, x49) in the solution is also supportive of the interpretation as a whole. As noted above, the family farming oriented component (**PP1**) places stronger emphasis on present intrinsic value (x49), whereas the fields as family heritage component (**PP2**) the heritage element (x48) receives greater stress. Many family farms have been created within living memory, and their social and political role has been institutionalised during the post-war period; i.e. they have created their own social space within the corporate state (see section 4.5). As the length of family ownership of fields can be very long, and the mode of creation of old, established farms was quite different from the post-independence (1917) and especially post-war situation, the fact that the pc-solution discriminates so clearly between these two types of farm is expedient. Given this result, the weaknesses of this rather intuitive analysis are at least partly justified.

7.5.3 Present-future intrinsic field ownership value

The two component pc-solution (Table 33) based on present intrinsic value (x49) and future intrinsic value (x50), is not dissimilar to the previous model. No major interpretation changes need to be made (**PP1** relates to **PF1** – *Family farming and the intrinsic value of place continuity*; and **PP2** relates closely to **PF2** – *Field ownership as family heritage*). Nonetheless, subtle differences occur which may be relevant.

The time-related intrinsic value variables (x49, x50), while loaded on the family farming related component (**PF1** – *Family farming and the intrinsic value of place continuity*), are only weakly but positively loaded on the field as family heritage component (**PF2** – *Field ownership as family heritage*). The polarisation of the family-farming variable (x44) and the length of family ownership variable (x7) is therefore much less pronounced; both are here positively loaded, and furthermore, x44 is quite strongly loaded on both **PF2** and **PF1**. Thus, in this **present-future** oriented pc-solution, the value of family-farming support is seen to be held by those farmers with a long family ownership tradition. The question must therefore be raised as to whether the future insecurity of Finnish farming, discussed in Chapters 1 & 2, is here receiving empirical expression.

Table 33. Varimax pc-solution concerning ties to place (present-future time dimension).

	PF1	PF2
x49	0.80	0.18
x50	0.79	0.25
x44	0.60	0.45
x43	0.56	0.15
x7	0.10	0.86
Variance explained %	39.04	21.33
Eigenvalues	1.96	1.06

Where:

- x7 – Time the farm has been in the same family
- x43 – The agricultural landscape is central to the cultural tradition
- x44 – Family farming is more important than production efficiency
- x49 – Ownership of fields has, for me, value in itself
- x50 – My fields are my heirs' links to their family roots.

7.6 Intrinsic value of field ownership and the decision to afforest fields

The causal effects of the importance of place on farmers' preconditions for and objections to field afforestation are tested in two ways. First, the technique of adding dependent variables to the pc-solutions is tried for the main reason that the components, with their small numbers of variables and complex loading patterns (i.e. variables loaded onto both components) could make component scores unreliable. Secondly, despite the above risk, component scores are calculated and correlated with the dependent variables. The results are presented in Table 34. The dual results are both mutually supportive and contradictory, for reasons which will be discussed.

The correlation analysis results are considered first. The **push-pull pre-conditions** for field afforestation (x29a, x29c) systematically obtain negative signs, as expected. The push-motive (x29a) is significantly correlated with **Family farming and the intrinsic value of place continuity** in both past-present and present future modes (PP1 and PF1), and it is interesting to note that the correlation is stronger with the present-future model, suggesting that *resistance to the push-preconditions will increase with time*. The push-precondition is not significant with respect to **Field ownership as family heritage** (PP2 or PF2).

Both PP1 and PF1 are negatively and significantly correlated with respect to the pull-precondition (x29c), and again the significance increasing towards the future – suggesting that the pull-motive will also weaken with time. The pull-precondition is significant with respect to **Field ownership as family heritage** (PP2 in the past-present mode), but just non significant in the present-future mode (PF2). This suggests *a slight reduction of future resistance to the pull-precondition concerning afforestation*. In fact, the component **Field ownership as family heritage** (PF2 – present future mode) *does not correlate significantly with any pre-condition*.

The **short-rotation precondition** (x29d) is also negatively correlated with each component, almost significantly in the case of **PP1** and significantly with respect to **PP2** (again showing an increased significance towards the future). Other correlations are non significant. This result is, perhaps, disappointing. It had been expected that resistance to the short-rotation option in field afforestation would be less than for normal rotation forest species. The analysis does not support this expectation, although the weakest correlations with preconditions occur with respect to the short rotation precondition.

Table 34. Correlations and loadings of dependent variables with respect to principle components models of place values in the past-present, present and present-future time modes

Dependent variables	Time-related place models			
	Past-present		Present-future	
	PP1	PP2	PF1	PF2
Correlations				
x29a (push)	-0.10*	-0.06	-0.17**	-0.06
x29c (pull)	-0.09*	-0.13**	-0.14**	-0.08
x29d (short-rotation)	-0.08	-0.02	-0.09*	0.00
x30c (Good fields)	0.28***	0.12**	0.30***	-0.02
x30e (leasing better)	0.08	0.02	0.08	-0.02
x30f (Emotional objection)	0.25***	0.28***	0.34***	0.13**
x19f (Afforest all fields)	-0.16***	-0.12**	-0.16***	-0.03
x19g (afforest selected fields)	-0.14**	-0.07	-0.14**	0.00
x38 (Historical objection)	0.38***	0.07	0.41***	-0.08
Loadings				
x29a (push)	-0.24	-0.09	-0.16	-0.46
x29c (pull)	-0.06	-0.40	-0.13	-0.54
x29d (short-rotation)	-0.27	-0.01	-0.13	0.42
x30c (Good fields)	0.55	0.10	0.53	-0.08
x30e (leasing better)	0.28	0.01	0.11	-0.40
x30f (Emotional objection)	0.14	0.61	0.01	0.65
x19f (Afforest all fields)	-0.28	-0.20	-0.24	-0.34
x19g (afforest selected fields)	-0.33	-0.04	-0.31	0.07
x38 (Historical objection)	0.71	0.05	0.63	-0.32

***p = 0.001 or less; **p = 0.002–0.01; *p = 0.02–0.10.

Where:

PP1 – Family farming and the intrinsic value of place continuity (Past-present)

PP2 – Field ownership as family heritage (Past-present)

PF1 – Family farming and the intrinsic value of place continuity (Present-future)

PF2 – Field ownership as family heritage (Present-future)

x29a (Affpos3) – Will afforest if agricultural support decreases

x29c (Affpos1) – Will afforest if the afforestation fee is paid in a lump sum

x29d (Affpos2) – Will afforest if short-rotation is in question

x30c (Affneg3) – Good fields

x30e (Affneg2) – Leasing fields of greater benefit

x30f (Affneg1) – Emotional reasons

x38 (Opinion) – Fields should not be afforested as their clearance involved heavy work.

x19f – Do you plan to afforest all your fields in next the 5 years?

x19g – Do you plan to afforest some of your fields in the next 5 years?

With respect to **objections** to field afforestation, **good fields** (x30c) receives positive and significant correlations with **Family farming and the intrinsic value of place continuity** (in both time modes – PP1 and PF1). *The emotional objection to field afforestation (x30f) is positively and very significantly correlated with all components.* Leasing the field as an alternative to field afforestation (x30e) is not significantly correlated with any component.

The **historical objection** (x38) is positively and very significantly correlated with **Family farming and the intrinsic value of place continuity** (PP1 & PF1), but is virtually uncorrelated with **Field ownership as family heritage** (PP2 & PF2). The result supports the interpretation of these two sets of components; family farms often have a relatively short history; thereby raising the importance of historical values. The families which have possessed farm land for very long periods have seemingly collectively forgotten the pioneering phase of their farms – the ownership of fields is *taken for granted*, and therefore no longer *actively* relevant.

Planned field afforestation activities (x19f & x19g) receive identical negative and significant correlations with **Family farming and the intrinsic value of place continuity** (PP1 & PP2), and x19f is also significantly and negatively correlated with **Field ownership as family heritage** (in the present-present mode – PP2), but not so in the present-future mode (PF2). The result suggests a strong resistance to field afforestation in all cases except **Field ownership as family heritage** with respect to the future (PF2). This leads to the intuitive conclusion that, as explained above, a long tradition of ownership has reduced active resistance to land use change.

As noted, a second set of results have been obtained by adding the dependent variables to the component solutions. Because of the nature of principle components analysis, the way in which variance is extracted and assigned (loaded) to components in a two-component solution is likely to lead to a polarisation of results. For each pair of components, the dependent variables are clearly loaded in favour of one or the other (unlike the correlation analysis above in which the dependent variable may be correlated with the scores of both components in a given solution). As each dependent variable becomes part of the component solution it is possible to determine with which basic dimension or component the variable has greater association: the components' tendency to polarise assisting this process. For example, whereas in the correlation analysis component **Field ownership as family heritage** (PF2) only correlates significantly with one dependent variable (x30f – Emotional reasons), in the component method **PF2** possess a wider association with dependent variables.

The **push-pull preconditions** for field afforestation (x29a, x29c) behave much the same way as in the correlation analysis when added to the **past-present model** (PP1 & PP2), and little additional comment is required. On the other hand, with respect to the **present-future model** (PF1 & PF2) the situation is quite different, with the push-pull variables being loaded strongly and negatively (as expected) on **Field ownership as family heritage** (PF2). The short-rotation precondition (x29d), on the other hand, is positively and strongly loaded on **PF2**, but it is negatively loaded on all other components. The result, compliments that of the correlation analysis. The loadings suggest that **family heritage** is indeed an important aspect in the resistance to field afforestation, as expected on the basis of the frame of reference. This interpretation is supported by the positive loading of x29d, as **short-rotation species** do not represent a termination of the field as an entity, as a *place*. The negative loadings of x29d on the other components, and especially the **family-farm** components (PP1 & PF1) are again symptomatic of the recent history of this form of farming and the resistance to all but agricultural land use values.

In the case of family farming, the tendency for resistance to field afforestation to increase in the future mode is not evident, as in the correlation analysis, but this may be a result of the inevitable if only minor changes the addition of the variables had on the component solution.

Concerning **objections to field afforestation** (X30c, x30e, x30f), there are again both similarities and dissimilarities with the correlation analysis. The **good fields** objection (x30c) is strongly and positively loaded onto the **family farming** components (PP1 & PF1), but not on to the fields as **family heritage** components (PP2 & PF2). This, yet again, suggests that the family-farmers are placing enhanced value of fields because of recent history, whereas fields are taken for granted by the second group of farmers.

Leasing fields (x30e) is an economically justifiable alternative to field afforestation, and it was perhaps surprising that the performance of this variable in the correlation was so dismal. The results of the component method are closer to that expected on the basis of the frame of reference. The strong positive loading of the leasing fields alternative (x30e) on **Family farming and the intrinsic value of place continuity** in the past-present mode (PP1) indicates that given the recent history of the field, its leasing is considered to be financially, and probably emotionally, a better solution than afforestation. Income is obtained and the Field remains a field! Further, legal tenure is maintained. On the other hand, the strong negative loading of x30e on

Field ownership as family heritage (PF2) presents the logical opposite. Leasing is rejected: a response to a jealous ownership tradition? Such an argument can be justified given the possessive and stubborn nature of many farmers. The latter argument is supported by the strong and positive loadings of **emotional objections** (x30f) on **Field ownership as family heritage** in both time-modes (PP2 & PF2); i.e. *the emotional objections are attributed to the family heritage components rather than the family-farm components.*

The **historical objection** (x38) is strongly and positively loaded onto **Family farming and the intrinsic value of place continuity** (PP1 and PF1), again supporting the recently acquired status of family-farming. The historical objection is weakly loaded on PP2 and negatively loaded on PF2 – again supporting the reduced *active* historical significance of those farmers whose fields are *taken for granted.*

Planned field afforestation (x19f, x19g), as in the correlation analysis, is strongly and negatively associated with family farming (PP1 & PF1). The afforestation of all fields (x19f) is also largely unplanned by farmers whose farms have a long history of family ownership, but not so partial afforestation (x19g).

8 Human aspects of the institutional environment for field afforestation

8.1 The nature and influence of local policy administrators

Earlier investigations have indicated that the institutional environment for agriculture and forestry has had direct and indirect consequences on the intensity of field afforestation activities. Less understood, however, is the role of the local institutional environment on farmers' decision making concerning field afforestation. The frame of reference has presented the argument that local agricultural and forestry experts create a *social space* – a space which is at the same time a power space, employed to advance the corporate interests of the profession(s) or sector(s) in question.

The importance of this social space to the problem in hand is demonstrated by the fact that it is the local administrators of corporate power who introduce, advise and manipulate policy instruments at the local level. Thus, while policy concerning field afforestation may be clear at the national level, its interpretation and application at the local level may be far less straightforward.

As part of a wider investigation concerning rural development, agricultural, forestry and trade advisors of the communes in which the present investigation was conducted, were sent a questionnaire concerning agricultural and land use policies and especially field afforestation (appendices 2 & 3). Twenty-eight replies concerning the 11 communes in question, are employed in this investigation (the number is less than 33 because not every commune has a trade advisor). The role of sectorial advisors in the development of rural land use policy objectives is discussed in more detail by Petäjistö & Selby (1994b).

The frame of reference paid attention to ties-to-place, and so it is pertinent to inquire of the communal advisors' own place of origin. It is not unreasonable to expect that an official whose roots are in the commune in which he works will possess strong ties to place which may affect his decision making. Over 60 % of the advisors were from either the same commune by which they were employed or from the neigh-

bouring commune. In addition, 36 % of the advisors owned forests in the commune in which they worked, and 29 % also owned farmland. It can be expected, therefore, that the advisors have strong personal links to the communes they serve and especially to the people they serve. These links can be expected to effect advisors interaction between local policy issues and agricultural and forestry policies at the national level. This has much to do with the local variations in policy interpretation found by Mustonen (1990).

The frame of reference also made note of the fact that the formation and maintenance of social space has professional or corporate implications. Education is a key element in the creation of professional paradigms and interest groups, and this too is expected to have as strong influence on the decision making process: a process likely to be enhanced by the very strong and durable structure of the corporate state in Finland (e.g. Selby 1994).

Education and appointment related closely to each other (Table 35); there being little "leakage" of academic disciplines across sectorial boundaries. All forestry advisors had a forest-related education, while 66 % of the agricultural advisors were agronomists. Trade advisors had a different base, although two in this sample had either a forestry or agricultural degree.

Table 35. Educational background of communal advisors

	Agricultural advisor n = 9	Trade advisor n = 8	Forestry advisor n = 11
Agricultural degree	66.6	12.5	0.0
Forestry degree	0.0	12.5	18.2
Forest engineer	0.0	0.0	81.8
Other	33.3	75.0	0.0
Total	100.0	100.0	100.0

Table 36. Power to advise by profession groups

	Ag. advisor n = 9	Trade advisor n = 8	Forestry advisor n = 11	All n = 28
Little	66.6	37.5	36.4	46.4
Strong	33.3	62.5	54.5	50.0
V.strong	0.0	0.0	9.1	3.6
Total	100.0	100.0	100.0	100.0

Asked to what extent their advisory activities influenced farmers' decisions, 54 % of the advisors considered that advisory activities had a strong or fairly strong influence, while 46 % were of the opinion that advisory activities had only a slight influence. However, there were differences between sectors in this respect (Table 36). Agricultural advisors felt they had a weak influence on farmers' decisions, whereas forest advisors considered that they had a strong influence. Trade secretaries considered that they had a fairly strong influence on decision making.

8.2 Advisors' solutions to agricultural over production

Advisors were asked to respond to policy means for reducing the nations agricultural over production problem. The questions were general, in that they were the commonly discussed alternatives, and did not require a commitment to action from the respondent. The alternatives were, in fact, the same as those employed to determine farmers' farming-related attitudes (see section 8.1). Table 37 includes the farmers' responses for the purpose of comparison.

Table 37. Positive attitudes to selected solutions to agricultural over production, by professional groups and farmers, %

	Agricultural advisor n = 9	Trade advisor n = 8	Forestry advisor n = 11	Farmers n = 441
x6a – Reduce agricultural production intensity	33	50	27	48
x6b – Reduce State support for agriculture	67	87	64	32
x6c – Forestry should be made more profitable	100	100	100	79
x6d – Fields should be afforested	67	50	91	38
x6e – Increase compulsory set-aside	11	50	36	23
x6f – Voluntary shift to non-food production and short rotation energy trees	78	87	54	58
x6g – Reduce the number of farms	55	75	64	32
x6h – Increased landscape management farming	100	100	100	53

The responses reveal different attitudes between different groups, but also some surprising similarities. For example total support was given to the propositions that *forestry should be made more profitable* and *agriculture should have an increased role in landscape management*. On the other hand, an increase in compulsory fallow did not generally receive support from agricultural advisors, but was accepted more readily by forestry and trade advisors. As compulsory fallow implies a reduction in the social space of the agricultural sector, i.e. land is taken out of production and out of the sphere of the decision making process, the result is not surprising. This process of spatial contraction is even stronger in the case of field afforestation, and as expected agriculturalists were less favourable to this solution than foresters. Nonetheless, 66 % of the agricultural advisors supported field afforestation, but it has to be remembered that the question concerned a *principle* for the country at large rather than a *concrete policy* for the home commune.

A greater proportion of farmers than agricultural and forestry advisors were of the opinion that agricultural intensity should be reduced; a greater proportion of farmers than agricultural advisors believed that compulsory fallow should be increased; advisors rather than farmers reacted positively to a shift towards nonfood agricultural production; and farmers were less enthusiastic about farm number reductions and the reduction of state subsidies than were advisors. Predictable results. Concerning **field afforestation as a policy to reduce over production**, again farmers were less enthusiastic than advisors, with only 38 % of farmers approving of the method compared with 67 % of agricultural advisors and 90 % of the forestry advisors. Farmers, then, preferred production reduction measures rather than agricultural termination measures: an understandable result.

Advisors showed a clear tendency to belittle the significance of the effectiveness of agricultural production reduction measures in their home commune compared with the country as a whole (Table 38). With respect to each alternative, acceptance is invariably many percentage points lower for the home commune. This is particularly the case for field afforestation – the most radical of the alternatives from the standpoint of continued agriculture. Over two thirds of the agricultural advisors considered field afforestation (as a policy principle) to be effective at the national level, but less than two fifths considered it to be effective as a solution for their home commune.

Further, while almost all forestry advisors approved of field afforestation as a matter of principle (Table 37) and as an effective means of production reduction for the country as a whole, only 54 % considered

the solution to be effective in their home commune (Table 38)! *The results clearly suggests that ties-to-place have a stronger effect on decision making than professional affiliation.* Given that over half of the local advisors considered that they had strong or fairly strong advisory powers, the out come of their objections to field afforestation in their local advisory work may well be considerable.

Nonetheless, *resistance to or acceptance of field afforestation varies with professional group.* This supports the discussion concerning the formation of **social space** in corporate society. Agronomists who *lose* space are found to be more hostile to field afforestation than foresters who *gain* space. Additionally, field afforestation is seen by all professional groups to be *more significant for the country as a whole than for their home commune.* Thus, the combined effect of ties-to-place and objections to a measure seen as "closing" part of local history are discernible.

Most surprising is the weak support given to **environmentally friendly farming** as an alternative to over-production (Table 38). The result supports the arguments presented earlier concerning the social space of corporate interests. In other words, environmentally friendly farming is seen to be too "radical"; it is a solution which challenges the conventional "received wisdom" concerning the nature of farming. The same attitude was found in farmers, see e.g. the behaviour of the value component Val2 (eco-farming values) in sections 7.2 and 7.4.

Table 38. Positive attitudes concerning the effectiveness of certain means to reduce agricultural overproduction applied to the country as a whole (WC) and to home commune (HC), by professional groups, %

	Agricultural advisor n = 9		Trade advisor n = 8		Forestry advisor n = 11		Total n = 28	
	WC	HC	WC	HC	WC	HC	WC	HC
x7b – Voluntary set-aside	89	78	62	62	63	54	71	64
x7c – Compulsory set-aside	89	67	62	62	82	73	79	68
x7d – Production reduction agreement	44	22	62	62	91	73	68	54
x7a – Field afforestation	44	33	50	25	100	54	68	39
x7e – Environmentally friendly farming	22	11	62	62	18	18	32	29

Principal components were again employed to estimate basic dimensions in the data set, i.e. to determine the common elements of advisors' policy alternatives for solving agricultural over production (Table 39). The variables employed are those used in Table 37.

Sol1 – Radical agricultural contraction: The first component brings together reduction in the number of farms (x6g), an increase in compulsory fallow (x6e) and field afforestation (x6d). The component therefore represents a strong agricultural contraction dimension. The component is structurally comparable to the farmers' component **agricultural contraction-maintained intensity** (Att1), and it can be seen as a measure for agricultural cessation. **Field afforestation** (x6d) is strongly loaded onto this component, clearly indicating that advisors equate field afforestation with agricultural cessation rather than as a means for farm diversification.

Sol2 – Profitable forestry: The component is dominated by the strong and positive loading of the opinion that *forestry should be made more profitable* (x6c). As a reduction in agricultural production intensity (x6a) is rejected (it receives a strong, negative loading), the component clearly concerns seeking optimal land use solutions for farms in transition. The nearest equivalent component for farmers was a

Table 39. Advisors' attitudes to solutions to over production

	Sol1	Sol2	Sol3	Sol4
x6g	0.83	-0.29	0.28	0.00
x6e	0.76	0.03	-0.13	-0.12
x6c	-0.01	0.93	0.01	-0.08
x6a	-0.04	-0.54	-0.32	-0.54
x6f	-0.16	0.11	0.86	0.04
x6b	0.24	-0.17	0.51	-0.52
x6h	-0.06	-0.14	-0.02	0.89
x6d	0.66	0.37	-0.25	-0.03
Eigenvalues	1.93	1.51	1.29	1.13
Variance explained %	22.31	17.94	15.61	17.29

Where:

x6a – The intensity of agricultural production should be reduced

x6b – State support for agriculture should be decreased

x6c – Forestry should be made more profitable

x6d – Fields should be afforested

x6e – Compulsory fallow should be increased

x6f – Voluntary shift to non-food production and short rotation energy trees

x6g – The number of farms should be reduced

x6h – The role of agricultural in landscape management should be increased

strong shift in production (Att4). **Field afforestation** (x6d) also receives a moderate loading on this component which supports the pro-forestry interpretation. Contrary to the **radical agricultural contraction** component (Sol1), field afforestation is here assumed to assist farm diversification via a shift to forestry.

Sol3 – Competitive agricultural diversification: The component is characterized by the strong loading of *voluntary shift to nonfood and energy crops including short rotation forestry* (x6f). The "competitive" element of the interpretation is provided by the strong positive loading of the opinion that *state support for agriculture should be decreased* (x6b), as well as the negative loading (rejection) of a decrease in production intensity (x6a). The component does not find similar expression in the attitude model for farmers (section 7.4). **Field afforestation** is negatively loaded onto this component. Field afforestation is therefore *not associated* with possibilities for short-rotation wood energy production.

Sol4 – Landscape management subsidy for agriculture: The component is characterised by the negative loading of the variable *state support for agriculture should be decreased* (x6b) and the positive loading of the variable concerning *agricultures' role in landscape management* (x6h). As the latter is invariably discussed as a means for continuing state support for agriculture while avoiding the controversial question of direct production support, its inclusion here is understandable. A decrease in agricultural production intensity is rejected (x6a receives a negative loading). The component represents a maintaining of state subsidies to agriculture via landscape management. For farmers, similar views were expressed as **landscape management via alternative production** (Att2) and **subsidy reduction and fewer farms** (Att5 – signs reversed). Field afforestation is very weakly and negatively loaded on to **Sol4**.

The results of the above analysis possess strong similarities with the analyses concerning farmers in Chapter 7. Both, for example, exhibit a reluctance to reduce agricultural production intensity, and both show a preference for short-rotation forestry (in a nonfood agricultural context) than for field afforestation. This suggests that advisors and farmers inhabit the same value world, the same **social space**. Thus, while advisors considered that their power of influence was rather modest, their opinion is certainly underestimated.

The advisors possess considerable information, and it has been demonstrated elsewhere that farmers, as rural entrepreneurs, are passive towards information gathering (Selby 1989, Selby & Petäjistö 1992).

Thus, the active role must belong to the professionals, the advisors whose task it is to advise and assist in decision making. Their values and their opinions are clearly an influence in the application of national policies at the local level. The implications of this contention are not inconsiderable, and so it is important to understand to what extent and on what bases advisors object to field afforestation.

8.3 Advisors' objections to field afforestation

The advisors were asked to consider the importance of certain objections to extensive field afforestation activities both with respect to their home commune and with respect to the country at large. The first thing that has to be said is that the answers by professional groups (Table 40) show surprisingly little variation. Indeed, greater variation can be found between professional groups with respect to given objections than can be found with respect to an objections' applicability to the country as a whole or to the experts' home commune.

Some of the responses are indeed surprising. For example, forestry advisors were more protective of fields for securing farm incomes than were agricultural secretaries. Similarly, forest advisors rather than agricultural advisors considered the over production of wood to be an obstacle to field afforestation. A higher proportion of forestry advisors than agricultural advisors considered non-cultivation agreements to be a better alternative to field afforestation. Agricultural advisors clearly do not like non-cultivation agreements. Forestry advisors, no less than agricultural advisors, objected to afforesting drained fields.

Perhaps most surprisingly, agricultural advisors gave greater support to the **short-rotation energy forest alternative** than did forestry advisors. It will be recalled that forestry advisors were earlier found to be more sympathetic to ecologically friendly farming than agricultural advisors. Both solutions are "radical" and threaten the accepted wisdom of the disciplines in question, which is why it is easier to accept radical solutions for "the other discipline". On the other hand, **preserving the agricultural landscape** and **landscape management** as alternatives to field afforestation gained greater support from agricultural advisors than forestry advisors.

Given the low level of variance within the objections to field afforestation, results from multivariate analyses were not expected to produce clear results, and such was the case. Nonetheless, interesting results were obtained from discriminant analyses in which the *a priori* grouping variable was the profession groups. Two analyses were conducted, one for the whole country and one for the home commune.

Table 40. Proportion of advisors agreeing with certain objections to field afforestation as a policy for the whole country (WC) and their home commune (HC), % (ranked by averages)

	Agricultural advisor n = 9		Trade advisor n = 8		Forestry advisor n = 11		Total n = 28	
	WC	HC	WC	HC	WC	HC	WC	HC
x13d – Farmers' attitudes (emotional objections)	88.8	100.0	87.5	87.5	100.0	100.0	92.9	96.4
x13a – Fields required to secure farm incomes	77.7	88.9	87.5	87.5	90.9	81.8	85.7	85.7
x13j – It is objectionable to afforest drained fields	77.7	88.9	87.5	87.5	81.8	81.8	82.1	85.7
x13c – Afforestation is irreversible	88.8	88.8	62.5	62.5	81.8	81.8	78.6	78.6
x13b – Preservation of agricultural landscape	66.7	66.7	62.5	62.5	36.4	36.4	53.6	53.6
x13i – Short rotation energy forestry is a better alternative	44.4	55.5	50.0	62.5	9.1	18.2	32.1	42.9
x13e – Wood is already in excess	11.1	22.2	37.5	37.5	54.5	54.5	35.7	39.2
x13h – Landscape management farming is a better alternative	44.4	44.4	25.0	12.5	18.2	9.1	28.6	21.4
x13g – A set-aside agreement is a better alternative	0.0	0.0	25.0	25.0	36.4	45.4	21.4	25.0

The two analyses produced similar, but not identical results; the differences being regarded as interpretationally significant. Common to both analyses (Table 41) are the **preference for a fallow or non-cultivation agreement** (x13g) and **preference for short-rotation energy forestry** (x13i), with the latter being a relatively strong discriminator for the home commune. The whole country analysis also includes the objection that there is already **sufficient wood in the country** (x13e), while the at local level, **landscape management** (x13h) as a better alternative is significant.

On the basis of the group classification coefficients, forestry advisors in particular are seen to object to field afforestation on the basis of a **national surplus of wood** (x13e), and also to oppose **short-rotation energy forestry** in their home commune. Agricultural advisors also support the **excess wood objection**, but are rather favourable to **short-rotation energy forestry** (x13i). Trade advisors tend to take a central line on most issues, as noted earlier (Table 40). All three profession groups support the **landscape management** alternative for their own commune, which suggests a determination to maintain the *social*

Table 41. Summary of discriminant analysis of local advisors' objections to field afforestation in their home commune (hc) and whole country (wc)

Univariate F tests	Whole country		Home Commune			
	F	p	F	p		
x80e – Wood is already in excess	2.67	0.09				
x80g – Non-cultivation agreement is a better alternative	3.27	0.05	3.80	0.04		
x80h – Landscape management farming is a better alternative			1.96	0.16		
x80i – Short rotation energy forestry is a better alternative	1.77	0.19	2.87	0.08		
	Wilks' Lambda = 0.56 F = 2.57 d.f. = 6,46 p = 0.05		Wilks' Lambda = 0.41 F = 3.25 d.f. = 6,46 p = 0.01			
Canonical loadings	Whole country		Home commune			
	1	2	1	2		
x80e – Wood is already in excess	0.54	0.31				
x80g – Non-cultivation agreement is a better alternative	0.59	0.41	-0.63	0.40		
x80h – Landscape management farming is a better alternative			0.41	-0.43		
x80i – Short rotation energy forestry is a better alternative	-0.39	0.90	0.51	0.49		
Group classification coefficients	Agricultural advisor		Trade advisor		Forestry advisor	
	WC	HC	WC	HC	WC	HC
x80e – Wood is already in excess	1.65		2.25		2.60	
x80g – Non-cultivation agreement is a better alternative	1.35	1.06	2.20	1.71	2.89	2.62
x80h – Landscape management farming is a better alternative		2.00		0.96		1.69
x80i – Short rotation energy forestry is a better alternative	2.18	0.95	2.03	1.51	1.25	-0.17
Constant	-7.13	-6.36	-9.84	-6.69	-10.68	-6.76

space of the home commune, as well as preserving personal associations with a familiar landscape, i.e. **ties-to-place**.

The discriminatory power of the analysis was 64 % for the **whole country** objections (agricultural advisors 78 %, Trade advisors 25 % and forestry advisors 82 %), and for the **home commune** it was 61 % (67 %, 63 % and 55 % respectively). Notice that agricultural and forestry advisors' attitudes tended to be less well defined for the home commune, while those of the trade advisors tended to clarify – a result which again lends support to the contention that ties to place tend to overcome professional positioning.

9 Discussion

9.1 Summary

The aim of the investigation has been to determine the nature of farmers' objections to and preconditions for afforesting their fields in the near future. The approach has been both structural, following the tradition of earlier field afforestation studies, and behavioural, in that farmers' values and attitudes have been central to the analyses. The role of the institutional environment has also been given attention. The attitudes and views of local officials, placed to administer national agricultural and forestry policies, have been examined and their potential influence on farmers' decisions to afforest assessed.

The nature of farmers' interactions with the society in which they live, the rationality of their behaviour, their motivation and the formation of intrinsic values concerning field ownership and ties to place, were considered to be of importance to the formation of preconditions for and objections to field afforestation. This was considered to hold for both farmers and local officials, as both were argued to operate in the same social space. Social space being the medium through which corporate power operates and through which policy is administered and received.

Recent field afforestation activities on the sample farms showed that 19 % had previously afforested some parts of their farms, but significantly from the point of view of the problem in hand, only 7 % had decided to afforest fields during the period 1991–92. Only 8 % of the farmers were planning to afforest all of their fields during the next five years, but 23 % of the farmers were planning the afforestation of poor or marginal fields during the same period. The afforestation of poor or marginal fields is not a new development (see Selby 1980), but the process gains new perspective when compared with recent land clearance activities have resulted in an area of new fields which more or less equal the area of fields afforested during the same period (1969–1990).

The main reasons for the *current decision* to afforest fields were i) that it is the best land use alternative to both cultivation and set-aside; ii) anxiety concerning the future of agriculture in the face of GATT and possible EU-membership, and iii) the farm's production shift towards forestry.

Preconditions for afforesting fields in the future were largely based on financial motives. The strongest precondition (31 %) concerned an increase in the afforestation premium or other incentives, the next being the payment of afforestation subsidies as a lump sum (22 %). Both these were considered to represent *pull*-motives. On the other hand, the *push*-motive, as represented by a decrease in agricultural support, was not so important with only 13 % agreeing. An additional precondition was the ability to *afforest with short-rotation tree species*, and to be able to reclaim the field at a later date without paying the field clearance fee. This alternative interested 25 % of the 441 farmers in the sample. Despite considerable ambivalence over most issues, passive farmers showed a greater interest in the preconditions for field afforestation than active farmers.

Objections to field afforestation were, quite naturally, dominated by economic considerations, e.g. good fields (66 %) and fields required to secure incomes (58 %). Emotional reasons, together with preservation of the agricultural landscape and the irreversibility of afforestation each gained the support of 54 % of the sample of farmers. Examining the objections by principle component analysis revealed three main elements: i) emotional objections, ii) field tenure change preference, and iii) security of income, or the active farming objection. Each of the components extracted c.20 % of the total variance of the variables in the model, which means that the objections have substance. The strength of the *emotional objections* component was even stronger than had been expected on theoretical grounds. Indeed, emotional objections to field afforestation are shown to be of considerable importance to the lack of success of the field afforestation policy in Finland. *The results throw considerable doubt upon the likelihood of widespread field afforestation activities continuing in the future.* This conclusion is further strengthened by the fact that 54 % of the farmers considered the afforestation premium too small: the premium has since been suspended!

Preconditions for and objections to field afforestation were examined in the context of sets of attributes concerning aspects of farm ownership, farm typology as well as certain management attributes. The analyses were much in the tradition of field afforestation studies (as reviewed in Chapter 2) and while no real surprises were forthcoming, the analyses were able to examine preconditions and objections in an up to date context. The dependent variables employed in the analysis were derived from the principle components analyses of preconditions and objections, as well as additional variable concerning planned afforestation and the generation objection that field should not be afforested because they have been pioneered with hard work.

The **ownership** model contained three components which represented the life-cycle of farm ownership. The ownership component representing the very beginning of the farms ownership life cycle, namely the *deceased's estate* (Own3) can be seen as the point at which a new generation of ownership begins, through sale to either a family member or to a third party. Because of the implied uncertainty, this mode of ownership correlated very weakly with the dependent variables.

The component with the highest explanatory power proved to be that describing *younger active ownership* (Own2) – a component concerned with the early to middle part of the ownership life cycle. As expected, the younger active ownership correlated negatively and very significantly with both the *push* and *pull* preconditions for field afforestation, as well as with leasing fields (as an alternative to field afforestation). Similarly, young active ownership correlated positively and very significantly with the *good fields* objection.

The component representing the end of the ownership life cycle, *impending retirement and generation transfer* (Own1) correlated positively with most of the objections, indicating a reluctance afforest fields which would end a lifetime's work, and also jeopardise the farm structure for the succeeding generation. On the other hand, the impending generation transfer component correlated strongly and positively with planned afforestation. This suggests that two processes may be at work, afforestation being chosen where generation transfer will not result in the continuation of agricultural husbandry.

Farm structure was represented by a four-component typology; two components representing agricultural dimensions (Type1-arable and Type4-livestock) and two forestry dimensions (Type2-commercial forestry and Type3-amenity forestry). The amenity forestry component was considered to represent passive farms with little interest in commercial activities of any kind.

As expected, the behaviour of the farming components with respect to preconditions for, objections to and planned field afforestation proved to be very similar. Objections received strong positive correlation coefficients, where as preconditions and planned afforestation were strongly negative. An interesting, and perhaps unexpected result was the positive and significant correlation between grain farms and *emotional* objections to field afforestation.

The forestry components correlated less strongly with the dependent variables, with the preconditions being most sympathetically received by farmers stressing amenity forestry. Commercial forestry was positively associated with the *push*-precondition (the precondition depen-

dent upon a decrease in agricultural subsidies), and indicated that in the event of reduced support for agriculture the farmers in this case would shift towards forestry production. Under such circumstances, field afforestation would logically form part of the farms' forest production plan.

Management criteria were represented by four components which concerned **future management plans**. Two of the components addressed aspects of the cessation of agriculture, one a shift in production, and one concerned the expansion of agricultural production. A planned *cessation and sale of the farm* (Man1) was strongly and positively correlated with all preconditions, with the leasing alternative and with planned afforestation. Similar results were obtained for a *production shift towards forestry* (Man3) and a *planned subsidy-based reduction and cessation of agricultural. Agricultural expansion* (Man2) possessed surprisingly weak explanatory power, positively correlating with the *short-rotation* precondition and the *good field* objection, and negatively with the *leasing option*. A much stronger negative relationship to preconditions and planned afforestation, as well as stronger support for the objections was expected.

Another aspect of the farmers' management criteria which was examined concerned farmers' assessments of their **advisory requirements**. The main advisory requirements concerned agricultural cessation via forestry, a shift to forestry, economic diversification and agricultural cessation via landscape management. The advisory requirement concerning *agricultural cessation via forestry* correlated strongly and positively with the preconditions for field afforestation (including the short rotation option) and planned afforestation, and negatively with the *good fields* objection. The *shift to forestry advisory requirement* also correlated strongly with preconditions for field afforestation as well as with planned partial afforestation. Advisory requirement concerning *economic diversification* correlated fairly strongly and positively with the short-rotation precondition – a result which should be taken up by policy makers and advisory authorities.

The structural review of farmers' preconditions for, objections to and planned afforestation, gave results which largely support those of earlier investigations, notably Selby (1980a&b) and Anttila (1990). The main surprise was the unexpected strength of emotional objections to field afforestation, as well as the low level of planned afforestation (even before the suspension of the afforestation premium).

Farmers' attitudes and values and their affect with respect to field afforestation were examined in more detail in Chapter 7. The study of **farmers' values** revealed four clear positions: i) tradition, home-area

oriented values (Val1), ii) environmentally friendly or eco-farming values (Val2), iii) competitive or free-enterprise values (Val3), and iv) protectionist or *status quo* values (Val4). Not unexpectedly, these values were reflected in the policy attitudes held by the farmers.

Traditional, *home-area oriented values and protectionist values* correlated negatively with variables representing preconditions for field afforestation, as well as with variables for planned afforestation. *Free-enterprise values* led to a weak (non significant) rejection of preconditions, and weak (significant) agreement with objections to field afforestation, although the emotional objection that "*fields should not be afforested as their clearance involved hard work*" was very significantly and positively correlated with free enterprise values – a logical result.

Environmentally friendly, or eco-farming values were positively associated with preconditions for field afforestation as well as planned afforestation, including the short-rotation precondition. The good field objection was strongly and negatively correlated with eco-farming values. It would therefore seem that Eco-farming is seen as part of a means to reduce agricultural production.

With respect to farmers' attitudes concerning solutions to agricultural over production, 79 % were of the opinion that forestry should be made more profitable. Several of the solutions concerned *a possible shift to forestry*. Also highly rated as a solution to over production was *a voluntary shift to non-food production* (58 %). The least favoured solutions were an increase in *compulsory set-aside* (46 % against), and *reduction in state subsidies for farming* (44 % against). Nearly 40 % of the farmers approved of field afforestation as a solution to over production, *as a policy in itself*. (The implication that *policy and practice* are segregated in the minds of respondents gained empirical support from the study of local officials (Chapter 8).

Farmers' attitudes to solutions to agricultural over production were reduced to five components: agricultural contraction-maintained intensity (Att1); landscape management via alternative production (Att2), production intensity reduction (Att3), a strong shift in production (Att4); and subsidy reductions and fewer farms (Att5). These five policy solutions closely resembled those suggested by agricultural, forestry and trade officials (Chapter 8).

Policy attitudes which supported a *strong shift in production and landscape management* did not correlate with opinions concerning either preconditions for or objection to field afforestation. On the other hand, the three components representing various aspects of agricultural con-

traction, i.e. area reductions, fewer farms, or subsidised withdrawal, etc., were generally positively and significantly correlated with preconditions for field afforestation, but only weakly correlated with objections, with the exception of emotional objections which generally obtained strong negative correlations. The unavoidable conclusion from this analysis is that *farmers who have accepted the inevitability of field afforestation, and who have already decided to afforest some or all of their fields, are sympathetic to policy alternatives which support agricultural reduction.*

The role of the **intrinsic value of field ownership** in forming attitudes towards preconditions for, objections to and planned afforestation of fields also received tentative examination. The starting point of the analysis was the central tenet of the frame of reference that **ties to place** play a vital role in forming farmers emotional objections to field afforestation. The modelling exercise was carried out with the knowledge that many of the variables employed were skewed. Considerable caution was therefore taken during the analysis and the stability of the pc-solutions were tested at every stage. The results were accepted because of the logical behaviour of the pc-solutions with respect to both the theoretical expectations implied by the frame of reference and behaviour of the dependent variables in the subsequent analyses. As an additional precaution, two sets of results were examined, one based on correlations between component scores and the dependent variables, and one based on the loadings acquired by the dependent variables upon their entry into the basic component solution.

The results of both sets of analyses clearly demonstrated that *ties-to-place lead to a rejection of the preconditions for field afforestation* (both correlation coefficients and loadings were negative). Generally speaking, the component representing family farm-related intrinsic values concerning place continuity (i.e. the field as a place and the importance of ties to place) provoked stronger responses than the component representing field ownership as family heritage. Further, the responses were slightly stronger for the present-future context than the past-present time context. Thus while ties-to-place have a strong historical content, *the intrinsic value of place and ties-to-place are values which seem to be projected into the future, to subsequent generations, and this projection of values strongly weakens the role of preconditions for field afforestation, and strongly increases objections.*

Institutional aspects of field afforestation were examined through the medium of local (advisory) officials' attitudes towards measures to restrict agricultural over production and especially field afforestation. It was assumed that different professional groups would have different values – following the discussion concerning the production of social

space (section 3.3). Three groups of officials (representing agricultural advisors, trade advisors, and forestry advisors) were involved in the commune level inquiry (i.e. the same communes from which the sample of farmers was taken). As expected attitudes to the various agricultural policy alternatives followed disciplinary lines, with foresters supporting forestry and field afforestation, and agriculturists supporting voluntary shifts in production, the creation of a profitable environment for forestry and field afforestation. When asked whether similar measures would be effective at the national level and in their own commune, opinions were more supportive of restriction measures and field afforestation at the national level than for their own commune; the differences being in the order of 10 percentage points. In the case of field afforestation, the majority of officials approved of the means at the national level, but only forestry officials retained enthusiasm for the measure at the local level. Thus, not only were interests sectorial, as predicted by the frame of reference and as expected from sectorial interests in a corporate state, but subjective, emotional issues such as ties-to-place seemed to play a significant role in the formation of officials' attitudes.

A principal components solution of officials' attitudes to the proposed policy solutions to over production produced four components which strongly reflected those for farmers on the same issue. The components were: i) radical agricultural contraction, ii) profitable forestry, iii) competitive agricultural diversification and iv) landscape management subsidy for agriculture. Field afforestation was strongly and positively associated with radical agricultural contraction and profitable forestry, and negatively associated with competitive agricultural diversification.

Concerning their objections to field afforestation, differences between the professional groups largely disappeared: the variance in answers proved to be virtually non-existent. Again, objections with respect to the whole country were slightly less emphatic than objections with respect to the home commune. All the proffered objections were given strong support, but the two strongest were farmers' emotional objections (92 % for whole country, 96 % for own commune), the obvious economic objection that fields were required to secure income (85 % at both levels) and the fact that field afforestation was irreversible (78 % at both levels). Nonetheless, a further examination of the attitudes of local officials using discriminant analysis brought several surprises. Most striking was the strength of forest officials' objections to field afforestation at the national level on the grounds that wood was already in excess. The same objection was not significant at the local level. The other major surprise was the strength of officials' support for landscape management farming as a preferred alternative to field

afforestation; a solution supported by all officials, but especially forestry and agricultural officials.

9.2 Policy implications of the empirical results

Two alternative development possibilities for future afforestation activities were presented at the outset (section 1.2). The first alternative provided for a boom in field afforestation which would raise activities to the target 10 000 ha/year, and this level would be maintained for a short time as declining or retiring farms are wholly or partially afforested. The second alternative was one in which social resistance to further field afforestation will increase, irrespective of the size of the premium and other incentives involved. At the outset of the investigation in 1992 the first alternative seemed to be gaining empirical support, but at the time of writing there is every indication that the afforestation boom of the early 1990s has not been sustainable, as figures for 1993 are preliminary reported to be c. 13 000 ha, and the estimated field afforestation figures for 1994 are only 5200 ha (*Maaseudun Tulevaisuus*, 19.2.1994).

At the time of the present investigation, only 8 % of the farmers in southern Finland planned to afforest all of their fields, and 23 % planned to afforest only poor or marginal fields. The analysis concerning the ownership life cycle, management and advisory criteria, and farm typology, each indicate that support for the preconditions for field afforestation are associated with the impending cessation of agriculture and/or ownership disturbance (a result which supports earlier investigations by Selby 1980 and Anttila 1990).

On the other hand, objections to field afforestation are held by farmers who intend to maintain farming, while even farm diversification plans are not seen to greatly increase support for the preconditions for field afforestation (with the exception of short rotation forestry). As already demonstrated, emotional objections to field afforestation were harboured by the majority of farmers in the sample, and these objections were often found to overcome the often economically rational alternatives represented by the preconditions for field afforestation. On this basis alone, *it would seem that the recent mini-boom and current levels of field afforestation will not be sustainable.*

This conclusion is supported by the fact that the majority of those afforesting fields at the current time are passive, retiring farmers (see also Petäjistö *et al*). The conclusion gains further support from the fact that many farmers who afforested in 1991 and 1992 (see section 6.1) did

so because of their fields were no longer needed (66 %) and also because of the (justified) fear that the application system would become more difficult (22 %). This latter reason, in particular, strongly suggests that with inferior conditions for field afforestation in future, the current levels will not be sustained: a result which is given further support by the published field afforestation estimates for 1994 (5200 ha).

It would seem on the basis of the empirical evidence, evidence also supported by Petäjistö & Selby (1994) for the whole country, that the premiums and subsidies for field afforestation have largely been seen as a pre-retirement "bonus", or an additional source of income for farms which have already closed (Anttila 1990). From the stand point of regional economic and social development, it might be more profitable to link field afforestation grants, loans or premiums with farm diversification schemes, i.e. in the form of start-up or risk venture support¹³. The "investment" would then stand a better chance to be productive and at the same time act to build confidence in rural areas. This solution would better support recent trends in Finnish rural development policy (Rural Policy Committee 1992), as well as answering some of the OECD's criticisms concerning Finland's public investment policy (OECD 1989; 17).

Given that the majority of the officials considered that their power of influence over farmers was strong or very strong, then their own lack of enthusiasm for certain agricultural over production restriction policies *in their own commune* must be thought to influence farmers' decision making. The question must therefore be asked, Are nationally approved land use policies administered objectively at the local level? The answer on the basis of this investigation would seem to be "Not necessarily". Indeed, the attitudes of local officials strongly support the hypothesis that *policy measures are only as effective as their lowest level of operation*. In this case, the lofty aim of the national level policy makers with respect to field afforestation (up to 200 000 ha in the next ten years) does not seem to find similar support at the local level where the policy is administered.

The outcome of the EU-negotiations and its effect on Finland's agricultural structure remains in doubt, while domestic plans concerning the future structure of agriculture (Maatilahallitus 1991) imply a drastic reduction in the number of farms. Both leave the door open for con-

13. The legislation for such a development is already in place, namely the The Rural Livelihood Act (Maaseutuelinkeinolaki 1990/66): The Act enables funds to be made available for diversifying rural occupational possibilities. It is intended to support small-scale specialized farming, and other small-scale farm and forestry related enterprises. The act also provides for support of other small-scale enterprises which make use of local natural resources.

siderable speculation concerning future attitudes towards the afforestation of agricultural land. Nonetheless, only active farmers significantly reacted to these threats to agriculture. Just under a third of those active farmers who afforested fields in 1991/2 gave insecurity over GATT and EU negotiations as one of the reasons for their decision. Passive farmers, having ceased productive agricultural, were not threatened by these negotiations.

Some contradictions of Finnish land use policies were illustrated in section 1.1., and in any discussion on field afforestation it is well to remember that the area of field clearances during the period 1969–1990 were of the same order of magnitude than the area afforested. The considerable sums of public money which have been used to support field afforestation via the original field reservation programme, the forestry improvement fund, the afforestation premiums of the late 1980s and early 1990s, the expensive advisory and extension work involved in its promotion, as well as a long history of research into the biological and technical problems of field afforestation, would therefore seem to have been to no national advantage other than acting as a means for transferring limited economic resources required in other sectors of society to retiring farmers (a criticism supported by OECD 1989; 13–15). Further, the value of the growing stock on the 147 000 ha of afforested fields is not necessarily very high (see Ferm & Polet 1991). To make matters worse, improvements to farm structure through clearance activities, will have added to the agricultural over production problem.

Thus, despite contradictions and uncertainties concerning land use policies and the future of agriculture, farmers' generally weak response to preconditions for field afforestation and the strength and range of their objections to field afforestation, as well of those of local officials, seem to support the contention that resistance to field afforestation will again increase irrespective of the size of premiums, etc. The fact that the financial preconditions for field afforestation have recently be severely reduced only provides further support for the contention.

9.3 Sustainable primary production – policy alternatives for a living countryside

9.3.1 The extensification of primary production

Both the farmers and officials in the present investigation placed importance on landscape management farming and reducing the intensity of agricultural production. Similar views are also being expressed academically in Finland, e.g. Ollila (1993). There is an increasing

awareness that intensive forms of land management may, in the long term, be unsustainable. This is particularly the case in agriculture where the effects of intensive production are producing negative feedback in the form of, e.g. soil compaction and surface water eutrophication, but it is no less true for intensive forestry. The awareness of the importance of *sustainability* is, of course not new, (sustainability is subjected to an historical review by Douglass 1984), but the major modern discussion on the issue being stimulated by such publications as the Club of Rome report *Limits to Growth* and those concerning the *GAIA*-hypothesis (e.g. Lovelock 1979) and more recently by *Our Common Future* (World Commission 1987). Economists in various sectors are now very active in this field and the whole idea of sustainable development is being given considerable theoretical attention (see e.g. Pearce & Turner 1990).

The definitions of sustainable development, or sustainability, are many, each one stressing this or that aspect (Pearce et al. 1989; 173–185). The present discussion follows the definition of sustainable development offered by Markandya & Pearce (1988): sustainable development "is simple in the context of natural resources (excluding exhaustibles) and environments: the use made of these inputs to the development process should be sustainable through time". The conditions for this are summarised as "constancy of the natural capital stock" (Pearce et al. 1988), who argue that what is required are "non-negative changes in the stock of natural resources such as soil and soil quality, ground surface waters and their quality, land biomass, water biomass, and the waste assimilation capacity of receiving environments".

The means of achieving sustainable development are summarised by Pearce et al. (1989; 2–3) as follows: i) substantially increasing the emphasis on the value of natural, built and cultural environments; ii) extending planning time horizons both in the short- to medium term, and especially with respect to the longer term, e.g. generations; and iii) by "providing for the needs of the least advantaged in society ("intragenerational equity"), and on a fair treatment of future generations ("intergenerational equity").

The necessity to reduce agricultural surpluses as well as the need to conserve the renewable resources on which sustainable primary production relies, makes it essential to reduce any possibilities of serious damage to soil structure and ground water quality, as well as to limit any other ecological damage resulting from land use homogeneity and/or intensity (see e.g. Briggs & Courtney 1989, van Mansvelt 1988, Potter 1990). The extensification of primary production would seem to offer a means to address both problems (see Briggs & Court-

ney 1989 for a detailed discussion). Another means would be the integration of primary production (agriculture and forestry) policies with environmental policies with the aim of achieving sustainable production.

Industrial countries which have taken intensive production to its logical conclusions are now seriously considering the need for a return to less intensive methods. For example, in a review of prognoses for agriculture in the USA in the 21st Century, Delano (1983; 189–191) makes reference to the decrease of energy inputs, both in the form of fuel and oil-based agrochemicals. The savings of oil-products and energy being achieved by simplified low or non-tillage operations which bypass the plough. This method of cultivation is expected to increase rapidly to account for over 50 % of all U.S. farming. In Finland, research and development of non-tillage agriculture is gaining momentum (Finnish readers see e.g. Alakukku 1990).

Similarly, in Central Europe, agricultural extensification is seen to be an alternative to attempted reductions in the area under intense cultivation, a situation which closely resembles the Finnish case. For example, France, West Germany and The Netherlands are particularly committed to this alternative.

On the other hand, in the Netherlands as else where, it has been argued (Woltjer & Vroegop 1987, cited in Meeus et al. 1988) that farmers should not be individually forced to withdraw land from cultivation in order to decrease production. "In many areas of the (European) Community it is ... undesirable to limit agricultural activity any further. In these areas, the landscape and nature need to be preserved and the population kept stable" – and argument also heard in Finland. The alternatives to the extensification of production are several: it is argued (Woltje & Vroegop 1987) that farmers must be given a choice: abandon cultivated land or bear the financial consequences of overproduction. The existing duties on grain, milk and sugar should be replaced by a single duty on land. Regional structure plans would have to indicate the use to be made of this land by studying the alternatives, in which case afforestation is a practical alternative.

Summarising this brief review of a return to sustainable primary production, firstly extensification would decrease inputs of agrochemicals and energy per hectare, with a resulting fall, although not a proportional one, in the yield of crops per hectare. There are indications that the reduced costs of inputs may more than offset the reduced per hectare returns from extensified production; however, the economics of extensification urgently requires investigation.

Secondly, the reduction in inputs of agrochemicals and energy, as well as the use of shallow tilling methods and the use of lightweight machinery, would place less burden on the environment.

Thirdly, a more extensive agriculture would require more land to maintain any desired production level, thereby reducing the area of "surplus" agricultural land, and at the same time improve the "stewardship" of the agricultural cultural landscape (a topic to which the discussion will shortly return).

Finally, the discussion turns, briefly, to various approaches to the integration of primary land use policies. The discussion not only includes economic activities, but also the means to sustain ecosystems – both anthropomorphic and natural, and the behavioural approaches to achieving desired changes in the management of the countryside.

9.3.2 Land use and the landscape¹⁴

Meeus et al. (1988; 33) give the timely reminder that the landscape is a natural resource for the production of food and a place of human use. This explicitly implies that agricultural land must also be brought into the sphere of multiple use planning currently practised only in forestry and water management. Cultural landscapes are the product of the historical interaction of human land use and nature and are consequently more than the sum of parts – geology, topography, soils, vegetation, etc. They are the dialectic outcome of the interaction of man and his environment. Fernandes (1987, cited by Meeus et al. 1988; 33) considers that "Landscape management is the most expressive product of culture" and warns that the processes now at large in the landscape deny the whole concept and human meaning of nature.

Meeus et al. (1988; 33-58) identify 13 major landscape types in Europe. They also note with concern that a number of European landscapes are undergoing considerable, often irreversible, transformations because of changing agricultural practices, e.g. intensification, scale increase, abandonment, etc. Landscapes with frail ecosystems and little resilience are threatened with disintegration – including the fragile bocage landscapes of rural Finland, for example? Indeed, in many European countries, as well as the U.S.A. and Australia, concern over the conservation of farmed landscapes is becoming a major factor in the argument for extensifying agriculture¹⁵. Similar problems face

14. The important issue of landscape ecology should be discussed at this juncture, but it is omitted in the interests of brevity. Reference is made to e.g. Bruns 1988, Brus & Luz 1988, Forman & Godman 1986, and Vink 1983.

Finnish agricultural landscapes, and the effect of the considerable reductions in farm numbers and increase in intensification which are envisaged in Finland in the near future (Maatilahallitus 1992) as well as the abandonment of marginal farms which will be the corollary, cannot fail to have strong cultural landscape consequences.

Finnish environmental policy recommendations tacitly recognise the need for a multiple-use agricultural land use policy aimed at landscape conservation, and as such the policy is in line with policy trends in Central Europe. Following this, there is implicit admission for the necessity of an integrated land use policy based on ecological principles. This is also the case in Central Europe, where researchers are increasingly emphasising an ecological approach to landscape management.

Nevertheless, questions remain. For example what are the landscape preferences of the Nation and why do landscapes have to be conserved? It could be argued that these questions have yet to be asked in Finland, let alone be answered! Investigations into the multiple use of forestry have addressed the question of forest landscapes, i.e. the "architectural" properties within forests in consequence of silvicultural activities¹⁶. Similarly, a detailed set of case studies concerning nature and landscape in regional planning in the Nordic countries were made during the early 1980s under the auspices of Nordic Council of Ministers (Nordisk 1987). Otherwise, work on the landscape as a whole has been minimal (e.g. Granö 1952, Keisteri 1990), although there are signs that landscape is becoming an important concept and resource in Finland (e.g. Ympäristöministeriö 1992a&b, Antikainen 1993)

The need for such work is urgent, given the predictions of rapid landscape changes in Europe (in Meeus et al. 1988 referred to above). The urgency stems from the fact that landscape evolution is, practically speaking, an irreversible process. At the same time, landscape is a valuable commodity with a number of functions; functions which have been well summarised by Leonard and Stoakes (1977) in the context of agricultural change. The landscape, they argue (*ibid*; 128-130), can be valued in several ways¹⁷:

As a record of the past: the landscape contains historical features which are worthy of conservation as they form a link with the past;

15. See e.g. Goode 1969, Kasal 1976, Leonard & Stoakes 1977, Traill 1988, Potter 1990, see also OECD 1989b; 20, 51-55.

16. E.g. Lovén 1973 & 1974 and Savolainen & Kellomäki 1981. See also Axelsson-Lingren & Sorte 1986 for a significant Swedish contribution.

17. Much of the discussion here can be directly related to the discussion on the importance of space and place in section 3.3.

As an expression of local or regional character: throughout history the physical and human processes have created local differences in the landscape which give the rural regions greater diversity than towns and their recent suburbs;

As a contrast to the urban scene: the deteriorating urban environment increases the value placed on the countryside and rural landscapes, especially as reminders of an "idealised" rural past;

As an art form which confers status: individuals and societies assign values to non-functional elements of their lives, e.g. decorations on buildings, pretty gardens, etc., similarly, people place aesthetic value on agricultural landscapes which they then try to preserve (even though the landscape may be socially and economically redundant).

9.3.3 A multiple use approach to integrated land use

Finland, and the other Nordic countries, have for a number of years considered multiple-use criteria for inclusion in their continuously, but slowly evolving forest policies (e.g. Saastamoinen et al. 1984, Mattsson & Sødal 1988). Investigations into the role of forests in the psyche of Boreal man have given strength to such trends (Reunala & Virtanen 1987).

Future developments in domestic environmental and forest policies are discussed in two official Finnish reports, the Report of the Finnish Committee on Environment and Development (Komiteanmietintö 1989:9), i.e. Finland's response to the Bruntland Committee Report (World Commission 1987), and a report on the environmental policies of Finland (Ympäristöministeriö 1988). The reports stress the need to return to ecologically sound principles in both agriculture and forestry – with implications for multiple use – but no reference is made to integrate forestry, agricultural and environmental policies.

The Central Association of Agricultural Producers has also produced a rudimentary environmental programme (MTK 1990) which recognises that an integrated environmental policy, based on landscape ecological principles, would provide a sounder basis for land use integration and management, as well as environmental protection. However, reference is only made to multiple use principles in forestry, recommending, for example, (MTK 1990; 117) that forests' cultural, educational and social significance should be restored. *The use of the term restored implies, of course, the loss of something that was once*

part of the cultural wisdom of the nation. It could be argued that this cultural wisdom has been sacrificed on the twin altars of "rationality" and "efficiency". Thus, Finland's changing approach to forest policy, and the adoption of multiple use principles, can be cited as an example, albeit imperfect, of a move towards an integrated land use policy.

The multiple use principle in forestry includes recreation as a central element, and its role is expected to increase as society and economy develop into the post-industrial era. In agriculture, however, the multiple use principle is still very foreign, even in the presence of the right of access (every man's rights). Thus, the OECD report (1989a; 16), referred to earlier, observes that "The proximity of large areas of forest and other uncultivated land to all areas of cultivated land in Finland...makes agriculture less important as a source of amenity associated with nature and the environment".

This view is not entirely accurate. Agricultural land, as in the case of forest land, must be subject to multiple-use principles if an integrated land use policy is to be achieved. Indeed, the view stated in the OECD report (*ibid.*) seems to be at odds with Finnish environmental policies. As noted above, two Finnish environmental reports set out environmental policy recommendations for all sectors of the Finnish economy. These reports specifically recognise the task of agricultural landscape conservation in agricultural production and environmental policies (Ympäristöministeriö 1988; 124 and Komiteamietintö 1989:9; 93), but suggest a different approach to that outlined by OECD. The stress is placed on agricultural production balancing and the reduction of the environmental impacts of agricultural rather than on the multiple use of the (cultural) landscape.

However, from both Central Europe, as well as neighbouring Sweden, there is strong empirical evidence to support the contention that the multiple use of agricultural land must be a central requisite of land use planning. Investigations have demonstrated that there is often, on the part of the populace, a willingness-to-pay for the preservation of agricultural landscapes; because tens or even hundreds of years of tillage have created unique ecosystems, as well as aesthetic landscapes which possess strong cultural-historical symbols (see e.g. Drake 1987, for a Swedish example, Potter 1989, and OECD 1989b for a general outline). In the following section, the importance of the cultural landscape to rural land use policy making is examined in more detail.

Less easy to define are the various factors of landscape management which are becoming an essential part of land use planning in Central Europe. As already noted, the public, as well as the farmers them-

selves, may place a strong positive contingent valuation on the conservation of open, agricultural cultural landscapes: the conservation mechanism being increased extensive agricultural practices and a "stewardship" approach to natural resource management. A major problem remains that while contingent valuation may be potentially considerable, in real life compensation will certainly be demanded by the farming community: to what extent and in which form must be determined by urgent future investigations (see e.g. Kasal 1976).

Multiple use investigations in Scandinavia, following the lead of the U.S.A. have begun to address the question of landscape preferences, at least within the realm of forestry (see footnote 7 and USDA 1973 & 1974). This type of research requires to be extended to agricultural landscapes and landscapes of mixed land use and mixed habitats (as discussed above). A meso-scale landscape classification system was developed in Finland by Granö (1952), but what is now required is a micro-level visual and functional classification system upon which to base integrated land use planning for forestry, agriculture and environmental protection, including the conservation of the bocage cultural landscapes of Finland. Such a classification might be linked to the approach taken to study the agricultural landscapes of Europe as, for example, outlined in Meeus et al. (1988), but other alternatives exist which may be considered more appropriate for national needs (see e.g. Dearden & Sadler 1989 for a comprehensive set of approaches).

Underlying each of these tasks is the need for research into the micro and macro economic implications of i) the extensification of primary production, ii) environmental and habitat preservation, iii) a multiple use, integrated forestry and agricultural land use policy, iv) landscape management and v) the integration of appropriate land use with regional policies.

It is clear that the interests of the various interest represented in rural areas would be seriously challenged by agricultural extensification, primary land use integration, habitat restoration and landscape conservation, as well as by a general application of the multiple use principle. The rural community would be required to adopt new attitudes. In particular, from being the economic exploiters of the land, they would become the stewards of the land. *Stewardship*, to follow Webster's 9th New Collegiate (1985; 1157), means the individual's responsibility to manage his life and property with proper regard to the rights of others¹⁸. Stewardship is, then, more than just "good husbandry", which

18. See e.g. Heidegger (1947), Relph (1981), Brus & Luz (1988) Nassauer (1988) and Countryside Commission (1991a&b) for further discussions pertinent to the concept of stewardship.

has been one of the criteria of sound agriculture to date. The adoption of a position of stewardship is not impossible, as demonstrated by Nassauer (1988), but the behavioural adjustments required must not be underestimated; not least because rural communities with traditional values tend to distrust "new ideas" which have often been the fruit of ultimately unsuccessful policies.

Behavioural studies are therefore required to determine what are the fundamental behavioural attributes which assist or hinder the acceptance, by individuals and interest groups, the adoption of the multiple use principle of landscape management, i.e. the integration of agricultural, forestry and environmental interests in the planning of rural land use. Such behavioural investigations would have to address such fundamentals as individual and group perceptions, awareness, identification, etc. In addition, contingent valuation of fundamental economic and aesthetic values will be required, in order to assess the distribution of the costs and benefits of change.

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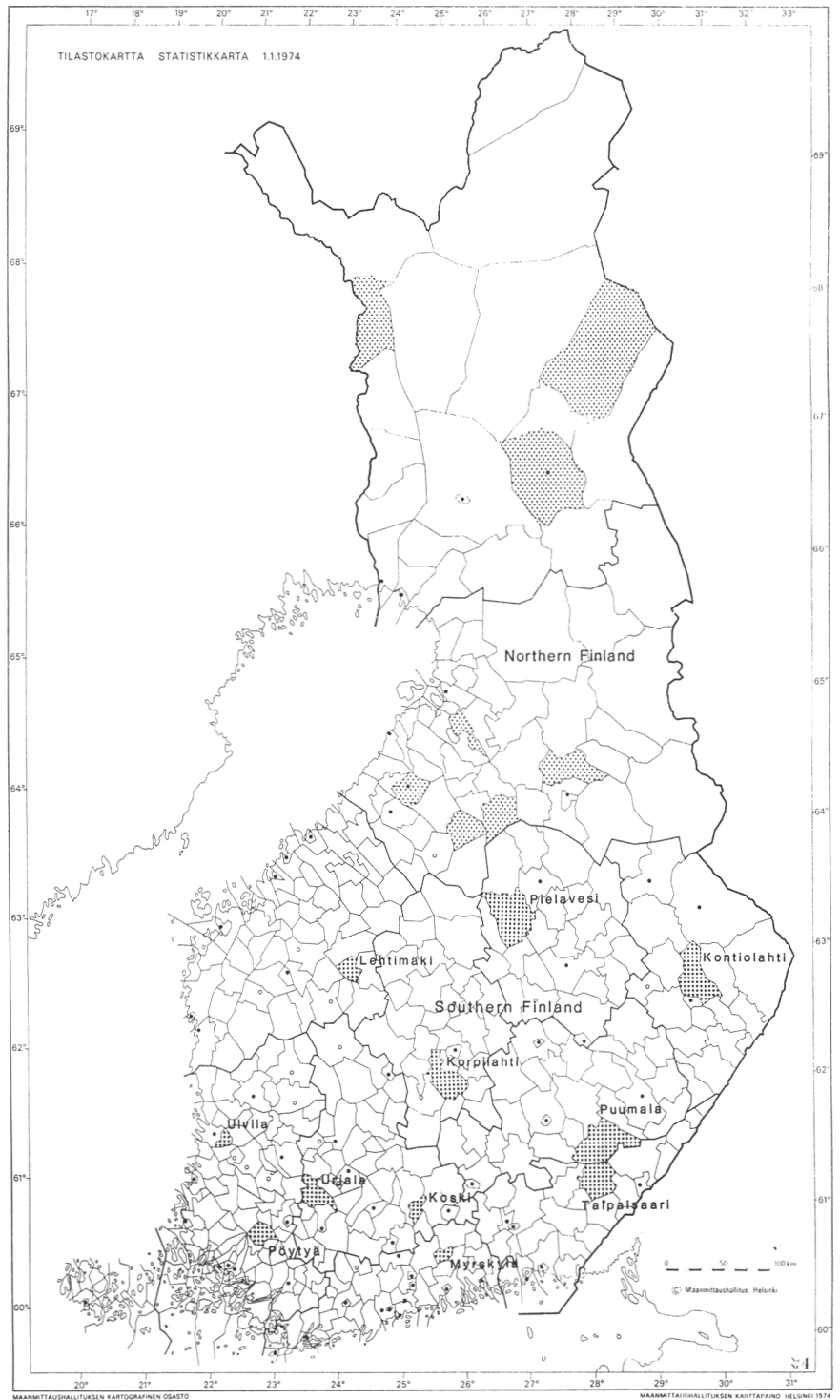
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**Appendix 1. Sample communes in southern Finland (named)*
in which farmer and advisor material was collected (see Chapter 4)**



*The material collected from the northern Finnish communes (unnamed) is examined in Petäjistö & Selby (1994a & b).

Appendix 2.

FINNISH FOREST RESEARCH INSTITUTE
Department of forest economics

QUESTIONNAIRE
translation from Finnish

A. Farm ownership and use

1. Farm location _____

2. Farm ownership

sole ownership	deceased's estate (heirs)
partnership	other, what?

3. Owner's age (where ownership is a partnership or heirs, give respondent's age) _____

years

4. Owner's agricultural or forestry education?

Agricultural education

none
technical school
college
university

Forestry education

none
technical school
college
university

5. Is the farm occupied throughout the year?

owner

yes	no
other	no

other

6. How long has the farm been in the possession of the current owner? _____

years

7. How long has the farm been in the owner's family? _____

years

8. How has the farm owner's net income been acquired, average for past 5 years?

%	from agriculture, main production line	
%	from forestry	
%	off-farm income	
%	elsewhere, what?	
total	100 %	

9. Has the farm a supplementary enterprise?

yes	no
-----	----

10. Is there a plan to begin a supplementary enterprise?

yes, what	no	cannot say
-----------	----	------------

11. Total area of farm in 1991

	ha, which
fields	ha
forest land	ha
other land	ha

12. Field area in 1991

a. leased to outsider	ha
b. rented from another farm	ha

13. Field use in 1991

1. under arable	ha
2. under grass	ha
3. compulsory fallow	
a) open fallow	ha
b) green fallow	ha
c) other, what	ha
4. other land use	ha, what?
Total field area	ha, (compare questions 11 & 12)

14. Has land been cleared for fields during past 10 years

yes,	(to nearest 0.1 ha)	no
------	---------------------	----

15. How do you assess the role of your forests?

	very important	fairly important	fairly unimportant	totally unimportant	cannot say
a. Commercial wood production and income from timber sales					
b. Amenity and recreation					
c. Environmental and nature protection					

16. How often have you made commercial fellings during the past 10 years? (or during your ownership period if less than 10 years)

none	per year
------	----------

17. How important to you are the following advisory topics?

	very important	fairly important	fairly unimportant	totally unimportant	cannot say
a. Concerning structural changes in agriculture					
b. Concerning alternative production strategies (e.g. ecologically friendly farming)					
c. Concerning supplementary income possibilities					
d. Concerning economic benefits from forestry					

2

- e. Concerning the farm's shift to forestry
- f. Concerning agricultural cessation
- g. Concerning landscape management

18. To what extent does farmer's own activity and actions affect future decision making?

very much	much	to some extent	not at all	cannot say
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19. Do you plan the following actions in the next 5 years?

	very probable	fairly probable	probably not	under no circum- stances	cannot say
a. Selling the farm					
b. Cessation of agriculture					
c. Generation transfer					
d. Expanding agricultural production					
e. Contraction of agricultural production					
f. Afforesting all fields					
g. Afforesting marginal or poor fields					
h. Purchasing forest land					
i. Selling forest land					
j. Other, what?					

20. If you ran into serious farm management difficulties, what would you do?

<input type="checkbox"/>	Try to continue as before
<input type="checkbox"/>	Try to put the farm on a new base
<input type="checkbox"/>	Try to find a better livelihood
<input type="checkbox"/>	Sell the farm
<input type="checkbox"/>	Other, what? _____

21. Is it possible that you might shift the farm's main production from agriculture to forestry?

no	partly	totally
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22. How do the following factors hinder a shift from agriculture to forestry?

	very much	fairly much	slightly	not at all	difficult to say
a. Small forest area					
b. Small cutting potential in near future					
c. Uncertainty concerning stumpage price developments					
d. Uncertain demand for delivery sales					
e. Own labour insufficient for forestry work					
f. No experience in forest work					
g. No interest in forest work					
h. Insufficient support for shift to forestry					
i. Poor social security benefits in forestry					
j. Other, what?					

A. Farm ownership and use

23. Has the farm had a land use restriction agreement during the past 5 years? (e.g. fallow agreements other than compulsory fallow)

yes	no
-----	----

24. Do you plan to enter a land use restriction agreement during the next 3 years?

yes	no
-----	----

25. Have you ever afforested fields?

yes	ha	no
-----	----	----

26. Have you yourself or your neighbor had poor experience with field afforestation?

no		yes	
what?	grass and weed problems	problems with officials	
	animal damage (voles, elks)	landscape problems	
	other, what?		

27. Have you afforested fields in 1991 or do you plan to apply for the afforestation premium in 1992? (If not, go to question 24)

yes	no
-----	----

28. What are your main reasons for your decision?

	Insecurity resulting from EU & GATT negotiations		Landscape reasons
	Fields no longer required		As a substitute for compulsory set-aside
	Ease of application		Farm to specialise in forestry
	Fear that application will become more difficult		Other, what?
	Best alternative to cultivation		

29. I will afforest fields in future

	probably	possibly	unlikely	under no circumstances	cannot say
a. If support for agriculture decreases					
b. If the afforestation premium and other incentives increase					
c. If the afforestation premium is paid in a lump sum					
d. If short-rotation forestry (energy trees) is in question and the Field clearance fee is waived in future.					
e. Other reasons, what?					

30. Your reasons for not afforesting fields?

	very important	fairly important	fairly unimportant	totally important	difficult to say
a. I have already afforested my fields					
b. Fields needed to secure income					
c. Good fields					

d.	Sale of fields of greater benefit				
e.	Leasing fields of greater benefit				
f.	Emotional reasons (e.g. fields recently cleared from forest land)				
g.	No personal benefit from afforestation				
h.	Complicated administrative process				
i.	No heirs or uncertain future ownership conditions				
j.	Preservation of the agricultural landscape				
k.	A noncultivation agreement is a better alternative				
l.	The field clearance fee restricts land use decision making				
m.	Size of premium compared to price of field				
n.	Afforestation is irreversible				

31. The State currently supports field afforestation e.g. via the noncultivation and afforestation premiums. In your opinion, is

compensation adequate	compensation too small	compensation should be	FIM/ha/yr
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32. I would prefer to afforest fields by natural rather than artificial regeneration (given the same compensation).	yes	no	cannot say
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33. Landscape management would be a better alternative to field afforestation.	yes	no	cannot say
The management premium should be			FIM/ha/yr

34. How do you react to these solutions to agricultural over production?

	completely agree	mostly agree	mildly disagree	totally disagree	difficult to say
a.					
b.					
c.					
d.					
e.					
f.					
g.					
h.					
i.					

C. Opinions

What is your own estimate concerning these agricultural and forest economy opinions??

	completely agree	mostly agree	mildly disagree	totally disagree	difficult to say
35.					
36.					
37.					

38.	Fields should not be afforested as too much work went into their creation				
39.	Agricultural and environmental policy should not be mixed together				
40.	The demands of agricultural production can be compromised for the benefit of nature conservation				
41.	Today, there is too much talk about overproduction				
42.	Modern agriculture is too intensive				
43.	The agricultural landscape is central to our cultural heritage				
44.	Family-farming is more important than food production efficiency				
45.	Family farming should be supported, even though this means higher food prices				
46.	Agriculture should be made to compete freely, just as any other enterprise				
47.	Agriculture and environmental management are the same thing				
48.	I consider my fields to be part of my family heritage				
49.	For me, ownership of fields has value in itself				
50.	My fields present to my heirs' links to their family roots.				

Finally, space is reserved for your comments and opinion.

Appendix 3.

FINNISH FOREST RESEARCH INSTITUTE
Department of forest economics

ADVISORY QUESTIONNAIRE
translation from Finnish to English

A. Background

Commune _____

1. Respondent's age _____
years

2. Where is your home

same commune as employer	same province/region
neighbouring commune	elsewhere

3. Professional qualification _____

4. How long have you held your present post _____
years

5. Do you own a farm or forest in the commune of your employment?

Forest	no	yes	Fields	no	yes
yes, do you cultivate your land	no	yes			

B. Attitudes towards farming, production regulation and field afforestation

6. What is your opinion of the following measures to reduce agricultural over production?

	totally agree	mostly agree	disagree	totally disagree	difficult to say
a. agricultural intensity should be reduced					
b. state support for agriculture should be further reduce					
c. forestry should be made profitable					
d. fields should be afforested					
e. compulsory set-aside should be increased					
f. voluntary shift to non-food production, e.g. bio-energy, short-rotation trees, etc.					
g. the number of farms should be reduces					
h. landscape management farming should be increased					
i. other means, which					

7. How important do you consider the following measures to be in reducing over-production?

	very important	fairly important	not very important	total insignificant	cannot say
a. field afforestation					
1 whole country					
2 own commune					
b. voluntary set-aside					
1 whole country					
2 own commune					

1

Appendix 4.

And what about co-operation between the following authorities?

	very good	good	poor	very poor	cannot say
with forest management association and rural advisory authority					
with forestry management association and agricultural advisory office					
with commune trade advisor and rural advisory authority					
with commune trade advisor and agricultural advisory office					

13. How important do you consider to be the following objections to field afforestation with respect to the country as a whole and your own commune?

	very important	fairly important	not very important	total insignificant	cannot say
a Fields requires to secure farm income					
1 whole country					
2 own commune					
b preservation of the agricultural landscape					
1 whole country					
2 own commune					
c afforestation of fields is irreversible					
1 whole country					
2 own commune					
d farmers' attitudes (emotional reasons)					
1 whole country					
2 own commune					
e wood is already in excess					
1 whole country					
2 own commune					
f administrative difficulties					
1 whole country					
2 own commune					
g a set-aside agreement is a better alternative					
1 whole country					
2 own commune					
h landscape management farming is a better alternative					
1 whole country					
2 own commune					
i short-rotation forestry is a better alternative					
1 whole country					
2 own commune					
j it is objectionable to afforest drained fields					
1 whole country					
2 own commune					

14. In your opinion, are there farms in your commune which would benefit from shifting their production balance from agriculture to forestry?

very many (>50 %)	many (25-50 %)	a few (10-25 %)	very few (< 10 %)	hardly any or none at all
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Statistics of variables employed in the investigation

Variable	Min	Max	Mean	S.D	n
1 FARM MATERIAL					
FIELD AFFORESTATION VARIABLES					
Reasons for field afforestation 1991/2					
x28a – Insecurity resulting from GATT & EU negotiations	0	1	0.18	0.39	27
x28b – Fields no longer required	0	1	0.66	0.48	27
x28d – Fears that applications will become more difficult	0	1	0.22	0.42	27
x28e – Best alternative to cultivation	0	1	0.07	0.26	27
x28f – Landscape reasons	0	1	0.07	0.26	27
x28g – Substitute for compulsory set-aside	0	1	0.14	0.36	27
x28h – Production shift to forestry	0	1	0.22	0.42	27
Future plans to afforest fields					
x19f – Plans to afforest all fields	1	5	1.84	1.10	441
x19g – Plans to afforest poor or marginal fields	1	5	2.58	1.29	441
Farmers' preconditions for field afforestation					
x29a – Will afforest if agricultural support is decreased	1	5	2.45	1.09	441
x29b – Will afforest if premium and other incentives are increased	1	5	2.89	1.28	441
x29c – Will afforest if premium is paid in lump sum	1	5	2.73	1.17	441
x29d will consider afforestation if short-rotation (energy) species are in question and that fields can be return to agricultural without penalty	1	5	2.75	1.20	441
Farmers' objections to field afforestation					
x30b – Fields required to secure income	1	5	3.74	1.27	441
x30c – Good fields	1	5	3.90	1.08	441
x30d – Selling fields of greater benefit	1	5	2.62	1.10	441
x30e – Leasing field of greater benefit	1	5	2.68	1.11	441
x30f – Emotional reasons	1	5	3.49	1.25	441
x30g – No personal benefit from field afforestation	1	5	3.05	1.17	441
x30h – Complicated administrative process	1	5	2.46	1.03	441
x30i – Uncertain future ownership conditions	1	5	2.59	1.14	441
x30j – Preservation of the agricultural landscape	1	5	3.53	1.18	441
x30k – A noncultivation agreement is a better alternative	1	5	2.89	1.09	441
x30l – The field clearance fee restricts land use decision making	1	5	3.05	1.14	441
x30m – Size of premium compared to value of field	1	5	3.16	1.13	441
x30n – Afforestation is irreversible	1	5	3.67	1.12	441
x38 – "Fields should not be afforested as too much work went into their creation".	1	5	3.58	1.31	441
FARM OWNERSHIP VARIABLES					
x2 – Farm ownership	1	4	1.29	0.68	441
x3 – Farm owner's age	22	86	49.68	12.20	441
x4ag – Agricultural education	1	4	1.32	0.59	441
x5 – Is the farm occupied throughout the year	1	3	2.71	0.67	441
x6 – Length of occupancy by the present owner	1	90	19.33	14.03	441

Variable	Min	Max	Mean	S.D	n
x7 – Length of ownership by owners' family	3	455	86.63	71.53	441
xnonfarm – No farming activities	1	2	1.30	0.46	441
x19c – Generation transfer planned	1	5	2.37	1.28	441
AGRICULTURAL STRUCTURE VARIABLES					
x11b – Field area	3	130	15.46	13.50	441
x11c – forest land area	0	380	41.33	40.47	441
x12a – Area of fields leased in 1991	0	45	1.43	4.64	441
x12b – Area of fields rented in 1991	0	30	1.92	4.78	441
x131 – Area cultivated fields,1991	0	69	7.36	11.37	441
x132 – Area of pasture land in use,1991	0	30	3.70	5.67	441
x133b – Area under green fallow,1991	0	22	1.08	2.38	441
x13all – Total field area,1991	0	85	15.55	14.80	441
x14a – Area of fields (ha) cleared during past 10 years	0.1	13.5	2.33	2.54	75
x15a – Importance of commercial forestry and wood sales	1	5	4.08	1.05	441
x15b – Importance of amenity and recreation forestry	1	5	3.51	1.07	441
x15c – Importance of forestry for nature & environmental protection	1	5	3.63	1.02	441
x16 – Frequency of commercial fellings in last10 years	0	10	3.27	2.97	441
xfldfor – Ratio of field area to forest area (x11b/x11c)	0	37	0.91	2.69	441
xgrass – Proportion of land under pasture ((x131/x13all)*100)	0	100	22.98	32.48	441
xgrain – Proportion of land under grain and arable((x131/x13all)*100)	0	100	31.42	32.99	441
xstock – Is their livestock	1	2	1.41	0.49	441
xgreen – Proportion of land under green fallow ((x133b/x13all)*100)	0	89	5.00	9.72	441
xsupp – Proportion of area rented as supplementary land ((x132/x13all)*100)	0	66	6.65	14.00	441
xclear – Proportion of land cleared in past10 years ((x14a/x11b)*100)	0	66	1.97	6.52	441
xfarm – Farm's main production line (incl. a labour criterion - see text)	1	5	3.70	1.34	441
xactive – Is farm active	1	2	1.68	0.46	441
xnonfm – Proportion of net income from farming less than 50%	1	2	1.30	0.46	441
VARIABLES CONCERNING MANAGEMENT CRITERIA AND MOTIVATION					
Farm management plans					
x19a – Sell farm	1	5	1.85	1.09	441
x19b – Cessation of farming	1	5	2.51	1.28	441
x19c – Generation transfer	1	5	2.37	1.28	441
x19d – Expansion of agricultural production	1	5	2.53	1.28	441
x19e – Contraction of agricultural production	1	5	2.27	1.16	441
x19h – Purchase of forest land	1	5	2.40	1.08	441
x19i – Sale of forest land	1	5	1.81	0.96	441
x21 – Economic orientation towards forestry	0	4	1.57	0.78	441
x24 – Voluntary set-aside agreement	0	2	1.15	0.39	441
Advisory requirements					
x17a – concerning the management of agricultural change	1	5	3.82	1.07	441

Variable	Min	Max	Mean	S.D	n
x17b – concerning search for alternative forms of production	1	5	3.45	1.22	441
x17c – concerning search for supplementary livelihoods	1	5	3.67	1.19	441
x17d – concerning increased economic benefits from forestry	1	5	3.91	1.01	441
x17e – concerning the farm's shift to forestry	1	5	3.25	1.16	441
x17f – concerning the cessation of farming	1	5	2.96	1.28	441
x17g – concerning farming for landscape management	1	5	3.22	1.13	441

FARMERS' ATTITUDES AND VALUES

Attitudes towards solutions to agricultural over production

x34a – Reduce agricultural intensity	1	5	3.29	1.36	441
x34b – Reduce state support for agriculture	1	5	2.78	1.34	441
x34c – Forestry should be made profitable	1	5	4.28	0.91	441
x34d – Fields should be afforested	1	5	3.00	1.28	441
x34e – Increase compulsory set-aside	1	5	2.56	1.21	441
x34f – Voluntary shift to non-food production	1	5	3.70	1.11	441
x34g – Reduce farm numbers	1	5	2.84	1.34	441
x34h – Increase landscape farming	1	5	3.51	1.07	441

General farming-related values

x35 – "The receipt of state aid limits landowners' ownership rights and independence".	1	5	3.00	1.27	441
x36 – "It is correct that the State monitors and controls the ownership and use of agricultural land".	1	5	2.46	1.30	441
x37 – "Wood production is more profitable than agriculture".	1	5	2.45	1.02	441
x39 – "Agricultural and environmental policy should not be mixed together".	1	5	3.50	1.30	441
x40 – "The demands of agricultural production can be compromised for the benefit of nature conservation".	1	5	3.35	1.18	441
x41 "Today, there is too much talk about overproduction".	1	5	4.07	1.16	441
x42 – "Modern agriculture is too intensive".	1	5	3.37	1.34	441
x43 – "The agricultural landscape is central to our cultural heritage".	1	5	4.45	0.77	441
x44 – Family-farming is more important than food production efficiency".	1	5	3.97	1.07	441
x45 – "Family farming should be supported, even though this means higher food prices."	1	5	3.81	1.16	441
x46 – "Agriculture should be made to compete freely, just as any other enterprise".	1	5	3.27	1.28	441
x47 – "Agriculture and environmental management are the same thing".	1	5	4.00	0.99	441
x48 – "I consider my fields to be part of my family heritage".	1	5	4.08	1.12	441
x49 – "For me, ownership of fields has value in itself".	1	5	3.83	1.17	441
x50 – "My fields present to my heirs' links to their family roots".	1	5	3.88	1.12	441

2 ADVISOR MATERIAL

ADVISORS' ATTITUDES AND VALUES

Attitudes towards solutions to agricultural over production (in general)

x6a – Reduce agricultural intensity	1	5	2.82	1.30	28
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Variable	Min	Max	Mean	S.D	n
x6b – Reduce state support for agriculture	1	5	3.64	1.06	28
x6c – Forestry should be made more profitable	1	5	4.71	0.65	28
x6d – Fields should be afforested	1	5	3.78	1.13	28
x6e – Increase compulsory set-aside	1	5	2.53	1.23	28
x6f – Voluntary shift to non-food production	1	5	3.96	0.99	28
x6g – Reduce farm numbers	1	5	3.42	1.26	28
x6h – Increase landscape management farming	1	5	4.35	0.48	28
Attitudes towards concrete solutions to agricultural over production (1-applied to whole country;2-applied to home commune)					
x7a1 – Fields should be afforested	2	5	3.50	1.03	28
x7a2	1	5	2.89	1.19	28
a7b1 – Voluntary fallow agreements	1	5	3.60	1.28	28
x7b2	1	5	3.46	1.34	28
x7c1 Increase compulsory set-aside	1	5	3.71	1.08	28
x7c2	1	5	3.53	1.23	28
x7d1 Production reduction agreements	1	5	3.46	1.10	28
x7d2	1	5	3.07	1.15	28
x7e1 Environmentally friendly farming	2	5	2.67	1.02	28
x7e2	1	5	2.46	1.13	28
Advisors' objections to field afforestation (1-applied to whole country;2-applied to home commune)					
x13a1 Fields required to secure farm income	2	5	3.89	0.87	28
x13a2	2	5	4.03	0.96	28
x13b1 Preservation of the agricultural landscape	2	5	3.14	1.11	28
x13b2	1	5	3.10	1.16	28
x13c1 Afforestation of fields is irreversible	1	5	3.82	1.15	28
x13c2	1	5	3.85	1.17	28
x13d1 Farmers' attitudes (emotional reasons)	2	5	4.17	0.77	28
x13d2	2	5	4.35	0.67	28
x13e1 Wood is already in excess	1	5	2.57	1.23	28
x13e2	1	5	2.64	1.25	28
x13g1 A set-aside agreement is a better alternative	1	5	2.42	1.06	28
x13g2	1	5	2.53	1.17	28
x13h1 Landscape management farming ia a better alternative	1	5	2.53	1.20	28
x13h2	1	5	2.42	1.10	28
x13i1 Short-rotation forestry is a better alternative	1	5	2.67	1.15	28
x13i2	1	4	2.50	1.13	28
x13j1 It is objectionable to afforest drained fields	1	5	3.96	1.10	28
x13j2	1	5	4.14	0.97	28

Metsäntutkimuslaitoksen tiedonantoja 502
Finnish Forest Research Institute
Research Papers 502

ISBN 951-40-1367-0

ISSN 0358-4283