

*J. Ashley Selby*

**FINNISH LAND USE POLICIES: FROM  
DISINTEGRATION TO INTEGRATION?**

**SUOMALAINEN MAANKÄYTTÖPOLITIIKKA:  
HAJAANNUKSESTA YHTENÄISYYTEEN?**



METSÄNTUTKIMUSLAITOKSEN TIEDONANTOJA 364

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Division of Social Economics of Forestry

METSÄNTUTKIMUSLAITOS  
Metsäteknologian osasto



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Metsäntutkimuslaitos on maa- ja metsätalousministeriön alainen vuonna 1917 perustettu valtion tutkimuslaitos. Sen päätehtävänä on Suomen metsätaloutta sekä metsävarojen ja metsien tarkoituksenmukaista käyttöä edistävä tutkimus. Metsäntutkimustyötä tehdään lähes 800 hengen voimin yhdeksällä tutkimusosastolla ja kymmenellä tutkimus- ja koeasemalla. Tutkimus- ja koetoimintaa varten laitoksella on hallinnassaan valtionmetsiä yhteensä noin 150 000 hehtaaria, jotka on jaettu 17 tutkimusalueeseen ja joihin sisältyy kaksi kansallis- ja viisi luonnonpuistoa. Kenttäkokeita on käynnissä maan kaikissa osissa.

*The Finnish Forest Research Institute, established in 1917, is a state research institution subordinate to the Ministry of Agriculture and Forestry. Its main task is to carry out research work to support the development of forestry and the expedient use of forest resources and forests. The work is carried out by some 800 persons in nine research departments and ten research and field stations. The institute administers state-owned forests of over 150 000 hectares for research purposes, including two national parks and five strict nature reserves. Field experiments are in progress in all parts of the country.*

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**Helsinki 1990**

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Attempts to regulate agricultural production in Finland by means of reductions in the area under cultivation and by field afforestation have failed. Capital inputs into agriculture have raised agricultural production by 20% since 1969, while the area under cultivation has fallen by c.10% during the same period. During this time, the area of grant-aided field afforestation achieved has been almost totally offset by the area of land clearances. Throughout Central and Western Europe, intensive agriculture and silviculture are causing unsustainable environmental damage, and the extensification of primary production is seen to be unavoidable. The paper argues that a return to a more extensive land use policy is required even in Finland. In contradiction to the policy of self-sufficiency, an integrated, ecologically sound, multiple-use land use policy is required. The policy would apply the behavioural concept of stewardship to a landscape ecological approach to land use planning in which land use for agriculture, forestry and environmental conservation would be fully integrated with regional planning.

Yritykset Suomen maataloustuotannon julkiseksi säatelemiseksi ohjaukseksi viljelypinta-alan vähentämisen ja peltojen metsittämisen avulla ovat epäonnistuneet. Viljelypinta-alan pienentyessä n. 10% vuosina 1969-1988, pääomapanokset nostivat samaan aikaan maatalouden tuotantoa 20%. Samalla ajanjaksolla pellon raivauksesta johtuva metsäpinta-alan väheneminen oli melkein yhtä voimakasta kuin valtion rahoittaman metsänistutuksen aikaansaama metsäpinta-alan kasvu.

Tässä tutkimuksessa osoitetaan, että maatalouden ylituotanto-ongelmia voidaan helpottaa palaamalla ekstensiivisempään maankäyttöön. Edellytyksenä pitäisi olla kokonaisvaltainen, ekologiset seikat huomioiva, monikäyttöön soveltuva maankäyttöpolitiikka. Lainsäädäntö ja maanviljelijöiden käyttäytymiseen vaikuttavat ongelmat ovat tarkastelun kohteena.

Key words: Agricultural production regulation, extensification, field afforestation, integrated land use policy, sustainable development.

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## FOREWORD

This investigation returns to the theme of field afforestation some ten years since the last major work on topic was published. During the 1980s, the public discussion on agricultural production balancing was stilted compared with the early 1970s, but the problems remained. Now, as we enter the 1990s, the self same problems of agricultural over-production, with the same attendant marketing strategy problems are again topical.

With negotiations in the GATT Uruguay Round progressing only with difficulty, with OECD severely criticizing Finnish agricultural policies, and with adjustments in agriculture being an inevitable result of Finnish moves towards the European Community, it was considered time to review the role of field afforestation as a means to reduce the area of land under agricultural production. This monograph therefore examines field afforestation activities of the past twenty years in the perspective of other aspects of land use policy. Considerable contradictions are found.

In number 365 of this series, Mustonen's Finnish language report examines field afforestation activities at the farm level in two dairy-farming communes, paying attention to the role of farm structure as well as land use legislation and its administration.

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Helsinki, October 1990

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## 1 THE AIM OF THE PAPER

The investigation is set against a background of continuous primary land use change in Finland. Until 1969, agricultural policy encouraged the clearing of land, mainly forest land, and its improvement for agriculture. Similarly, farm structure was improved, and farmers' incomes were improved with the aim of parity with at least the secondary industrial sector. However, since the early 1960s, chronic agricultural surpluses, confounded by the practiced policy of agricultural self-sufficiency, have created the need to reduce agricultural production. Since 1969, reductions have been achieved principally by means of the subsidized withdrawals of agricultural land from cultivation.

Primary land use change has not been given very much scientific attention during the 1980s. But Finnish agriculture is now once again faced with the need to undergo radical change. The reasons remain the same. The output in many agricultural sectors is too large for the sustained policy of self sufficiency, and the international market for the surplus goods is saturated.

The need to reduce agricultural production underlies the paper, but the question is raised whether, in the face of increasingly intensive production methods, reducing the area of arable land is the appropriate means. The paper examines the need to integrate agricultural and forestry land use policies on the basis of environmental sustainability. As a basis for such an integrated policy, a multiple use principle is evoked which relates to the growing discipline of landscape ecology.

The paper is structured as follows: first, in Chapter 2, post-war land use trends are briefly described. A review is then made of current Finnish agricultural policy. In particular, a critique is presented of Finland's policy of self-sufficiency in food production in a time of crisis as the basis of a peace-time policy. Forestry and environmental policies are also discussed.

Chapter 3 outlines the agricultural production restriction measures which have been introduced since 1969, while chapter 4 presents empirical evidence of the effects of these measures, with particular attention being given to field afforestation and land clearances.

Chapter 5 discusses the necessity of moving towards an integrated land use policy, i.e. a land use policy which integrates, at the local level, agricultural, forestry and environmental conservation land use: a policy aimed at sustainable development. Some suggested topics for future research concerning the institutional and behavioural aspects of integrated land use are briefly outlined.

## 2 LAND USE POLICY TRENDS

### 21. Agricultural policy

The basic Finnish agricultural policy objectives have remained much the same throughout the Post-War period. They are (e.g. OECD 1975;28-42, Kettunen 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 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. This policy stems from recent Finnish history and the policy of neutrality, as well as Finland's geopolitical reality. The policy of agricultural self-sufficiency is now beginning to be questioned, albeit hesitantly (see e.g. OECD 1989; 12-14). 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 1989; 13).

As an example of the high cost of supporting agriculture, OECD (1989) cites Finland's extremely high producer subsidy equivalents (PSE), which have increased from FIM 6919 million (GBP 974 million) in 1979 to FIM 16616 million (GBP 2340 million) in 1986. Thus, the relative support for agricultural prices in Finland in 1986 was c. 70%, compared with an average 50% for the countries of



the European Community (OECD 1989; 101). These high PSEs are mainly to support an artificial supply-demand structure in order to maintain the policy of food self-sufficiency "even in a time of crisis".

The official long term agricultural development programme (Maatalous 2000) maintains the same policy aims as those outlined above, although with some modifications (Komiteanmietintö 1987:24;114-116). 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 preservation. 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: anachronisms, because as early as 1960, the economic policy committee report recommended that the area of arable land in 1959 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 woodland for fields would jeopardize the expanding wood working industries. It also urged the cessation of land clearance activities, 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 after 30 years.

Following the Forestry Planning Committee Report, forestry intensification programmes were introduced (Heikinheimo et al. 1963), which echoed the concern that any increase in the area of agricultural land would require increasing food exports with the accompanying difficulties (ibid; 3, 31). Nevertheless, it was not until the late 1960s that short-term, as well as longer-term measures to reduce the area of land under cultivation were introduced.

However, despite aims to limit the level of agricultural production, the period 1967-1987, i.e. the period of the agricultural production balancing and restriction measures to be examined in this paper, witnessed a continuous increase in agricultural productivity (e.g. Toropainen 1990, and Yearbook of Farm Statistics 1987 & 1988). While there has been a 1.3 times increase in production (in real terms) during the period 1967-1985, gross capital formation (in real terms) has almost doubled, while labour inputs have decreased by nearly half during the same period.

Toropainen also notes that agriculture is increasingly indebted. The agricultural debt has increased 1.7 times since the mid-1970s which, allowing for the declining number of farms, translates to a factor of 2.2. Currently, the agricultural debt is virtually the same as the value of production, whereas ten years ago it was only half. These figures (examined further in section 44), together

with agriculture's continued overproduction of most major commodities, clearly challenge the credibility of Finland's agricultural policy.

## 22. Forestry Policy

During the period of agricultural expansion and rationalization, Finnish forestry policy also encouraged considerable improvements in growth and yield in the forests of non-industrial private forests (e.g. Holopainen 1981; 22-29). However, it can be argued that forestry policy has not been subject to the same internal contradictions as agricultural policy. One reason for this is that forestry has not been faced with over-production or a saturated market. Another reason is that the basic legislation affecting forest policy was already in place during the 1920s, notably the 1928 Law Concerning Private Forests, which strengthened promotional activities carried out by the district forestry boards, and the 1928 Forest Improvement Act and that amendments to this legislation during the subsequent 70 years have strengthened the original legislation, not contradicted it.

The forestry legislation in question created the necessary framework for state funds to support forest improvement projects in state and private forests. The Forest Improvement Act was placed on a permanent footing in 1967, and has been central to the intensification of silviculture during the 1970s and 1980s. Clause 6 of the Act was amended in 1969 to permit state appropriations to fund field afforestation (see detailed discussion in Selby 1980).

During the Post-War period, a considerable intensification of state and private forestry has taken place, mainly as a result of considerable investments of public money into forest improvement works. Such investment programmes include the Forest Funding (MERA) Programmes of the period 1965-75, which were partly financed with the aid of a loan from the International Bank for Reconstruction and Development (Holopainen 1981;22-29, Uusitalo 1978, Palosuo 1974). The stimulus for this investment was the ever-increasing demands for roundwood by the expanding Finnish forest industries (Holopainen 1981; 5-7).

Finnish nonindustrial private forests have traditionally been in farm ownership. According to Reunala (1974), 65% of the nonindustrial private forest area was owned by farmers. These forests were an integrated part of the farm economy (see e.g. Järveläinen 1971). The relationship between farmers and their forests has been changing throughout the 1970s, so that by the mid-1980s only 44% of the forest area was owned by farmers (Karppinen & Hänninen 1989). Of the holdings investigated, 33% were used mainly for agriculture, 10% divided their production orientation equally between farming and forestry, while 33% were oriented mainly to forestry. It is to be noted, however, that forest holdings are in question, not agricultural holdings. The results would be distributed differently if the basic observation unit had been agricultural holdings rather than forest holdings. This change has accelerated with the decline in full-time farmers and the increase in absentee farm-ownership (Järveläinen 1988, Karppin-

en & Hänninen 1989). Thus, Karppinen & Hänninen (ibid.) report that only 58% of forest owners reside permanently on their holdings.

A consequence of the structural change in the ownership of agricultural and forestry holdings is that agricultural land use policy and forestry policy are increasingly difficult to integrate at the practical level, a fact that has brought about a new challenge to Finnish land use policy making.

Recent agricultural policy changes have been aimed at restricting production, but to meet the ever-increasing demands for roundwood by the Finnish forest industries, forestry policy has continued to aim at improving both increment and allowable cut in Finnish forests. This is being achieved via the Forest Improvement Act and the Law Concerning Private Forestry. Indeed, the fundamental philosophy of forestry intensification is well demonstrated by the 1967 Law Concerning the Forest Service. This stated categorically that in its task to promote national forestry: "...every aim shall be made to treat the forests of the country so that an economically profitable and increasing timber production is continuously secured and the productivity of the soil utilized to the fullest extent possible. Moreover, attempts shall be made to put all the land that can best be used for forestry purposes, but is in a state of underproduction or nonproductiveness, under full timber production". The demands of environmental planning and conservation, as well as habitat protection, etc., as required by contemporary multiple use forestry have been clearly ignored from this (outdated) legislation.

The Law Concerning the Forest Service was renewed in 1987 (Law 138/1987); §2 of which now clearly states that the Service must take into consideration of forms of use other than simply wood production. Nature and environmental protection are also states as aims.

Reflecting the forest intensification (MERA) programmes of the 1960s, the Forest 2000 Programme (Forest...1986) is a long-term programme for forestry and the forest industries which aims at a better integration of timber production and other forms of forest use. The central aim of the programme is a substantial increase in the intensification of silviculture leading to a 3% increase in the production of the forest industries by the end of the 20th Century, and an increase in the total annual cut by 15 million m<sup>3</sup> by the year 2010.

### 3 AGRICULTURAL PRODUCTION REGULATION

#### 31. Agricultural production restrictions, 1969 - 1987

With the recognition of the need to both control the overproduction of agricultural goods, and to encourage the improvement of private forestry, a number of Acts were introduced in the late 1960s and early '70s to promote land use change from agriculture to forestry by means of tax relief and subsidies. The main features of the legislative changes of the 1970s are now summarized.

The Land Use Act (*Maankäyttölaki 1958/353*): The aim of this legislation was the improvement of the economic and social structure of agriculture by means of loans and subsidies for the acquisition of land, for the creation of fields (clearing forests, and removing boulders), and other improvements to the farm fabric. This act was the embodiment of the Finnish agriculture policy of the 1950s and 1960s. The subsequent legislation listed here seeks to reduce or reverse its effects.

The Farm Income Tax Act (*Maatilatalouden tuloverolaki 1967/543*): The act specifically exempted afforested fields from the normal forest taxation scheme, which is based on the average growth potential of forest land by site-types.

The Field Reservation Act (*Laki pellon käytön rajoittamista 1969/216*): The act permitted subsidies to be paid for the suspension of agricultural production for periods of three to nine years. Reserved fields could also be afforested, but permission from the local agricultural authorities was obligatory. Afforested fields received the reservation subsidy for 15 years. The field reservation act was repealed in 1975, and the last reserved fields have now been released from their contracts. The Field Reservation Act (§7a, 1977/421) amended the Field Reservation Act (1969/216) and substantially increased the subsidy for the afforestation of reserved fields.

The Forest Improvement Act (*Metsänpapuramislaki §6a, 1969/425*): This amendment to the 1967 Forest Improvement Act enabled state funds to subsidize the practical aspects of field afforestation, e.g. planning, materials, labour and replanting in case of failure of plants to establish for natural reasons. The amendment was introduced in connection with the Field Reservation Act. The Forest Improvement Act (§6a, 1975/202) amended Act 1969/425 by lifting certain restrictions concerning farm size and the wealth of the farm owner with respect to eligibility of subsidies for field afforestation. The amendment also allows for a 100% subsidy for the afforestation of field considered to be unsuitable for continued agriculture. Clause 6a ceased 1987 with the introduction of a new Forestry Improvement Act (1987/140), subsidies for the practical aspects of field afforestation are now considered to be part of normal afforestation activities (Forest Improvement Decree 1987/437 §2).

The Farm Closure Pension Act (*Luopumiseläkelaki 1974/6*): The act encouraged the enlargement of farms by the consolidation of arable land. The means is to offer a special retirement pension for farmers of 55 to 64 years old, after which the normal state pension scheme applies. The act enables poorly productive fields to be afforested under the terms of the Forest Improvement Act (§6a).

The Farm Act (*Maatilalaki 1977/188*): The act replaces the 1958 Land Use Act. The act has a broader brief with respect to rationalization measures, and forms the basis of the agricultural policy of the 1980s. The act also enables the Board of Agriculture to purchase and afforest fields.

Act Concerning Agricultural Production Regulation and Balancing (*Laki maataloustuotannon ohjaamisesta ja tasopainottamisesta 1977/446*): This act follows from the Field Reservation Act, with respect to which it is more flexible. Agricultural production adjustments are decided upon yearly. Desired changes in land use, especially the adoption of fallow, are then subsidized on the basis of yearly contracts. Contracted fields are specifically not exempted from the advantages of the field afforestation subsidies via the Forest Improvement Act. Act (1977/446) is amended at regular intervals to allow for changing requirements. Its present form dates from 1983 (Act 1983/81) and can be considered the main driving force for land use change in Finland. The act was further amended in 1987 (Act 1987/2) in favour of field afforestation. Under the terms of the Act, the farm owner receives a payment when he agrees to afforest fields which were in agricultural production the year prior to the afforestation agreement. The practical aspects of the afforestation may be wholly or partly covered by a subsidy under the Forest Improvement Act.

Act Concerning Agricultural and Forestry Land Procurement Rights (*Laki oikeudesta hankkia maa- ja metsätalousmaata 1978/391*): This legislation enables farmers to receive prior information on the sale of neighbouring farmland or forests, as well as priority purchasing rights. The aim of the legislation is to assist the rationalization of farm and forest holdings.

The Rural Livelihood Act (*Maaseutuelinkeinolaki 1990/66*): This wide ranging legislation replaces the Farm Act from the beginning of 1991. 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.

While the above acts and their respective decrees have been continuously modified during the 1980s, in essence the legislation has remained largely unchanged since the 1970s (see e.g. OECD 1975, 1989). From the standpoint of the present investigation, the important thing to note is that field afforestation as a means for reducing agricultural production has been strengthened.

To summarize, currently there are three ways a farmer or land owner may afforest fields: i) if the field area is still in cultivation, the farmer may apply for permission to afforest under the Agricultural Production Regulation Act, and if his application is approved he will receive a payment from 6000 to 9000 FIM/ha. On addition he may receive subsidies via the Forest Improvement Act to cover some or all of the material and labour costs; ii) fields which are still cultivated, or those on which cultivation has already ceased may be afforested under the terms of the Forestry Improvement Act, as noted above; and iii) the land owner may afforest his fields at his own cost, a procedure for which no permission is required.

### **32. Penalizing agricultural land clearance**

Much of the legislation reviewed above has been concerned with attempts to reduce the area under agricultural production. However, as noted in the introduction, Finland has a long history of forest clearance. Whilst subsidies for forest clearing ceased at the end of the 1960s, pioneering activities have continued up to the present day, especially in northern Finland. The costs of land clearance have been born by the farm owner. The parallel existence of field afforestation and forest clearance activities came to a head with new legislation in 1987.

Act Concerning the Field Clearance Fee (*Pellonraivausmaksulaki 1987/602*): This act 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 land to be cleared. 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 3000 FIM/hectare (GBP 1700/acre).

## 4 THE LAND USE EFFECTS OF AGRICULTURAL REGULATION MEASURES

### 4.1. Agricultural production control and land use change

Following from the review of land use regulation, above, the paper now turns to the empirical outcome of regulation. The main policy means have been field reservation, fallow contracts, and field afforestation (the investigation is not concerned with land use changes within productive agriculture, nor the regulation of livestock numbers although these are part of the legislation).

The roles of the various land use regulators since 1969 are first demonstrated by Figure 1. The role of field reservation are seen to have been significant during the early 1970s, but since the termination of the programme in 1974 the area of fields remaining under reservation contracts has diminished yearly until ceasing in 1989.

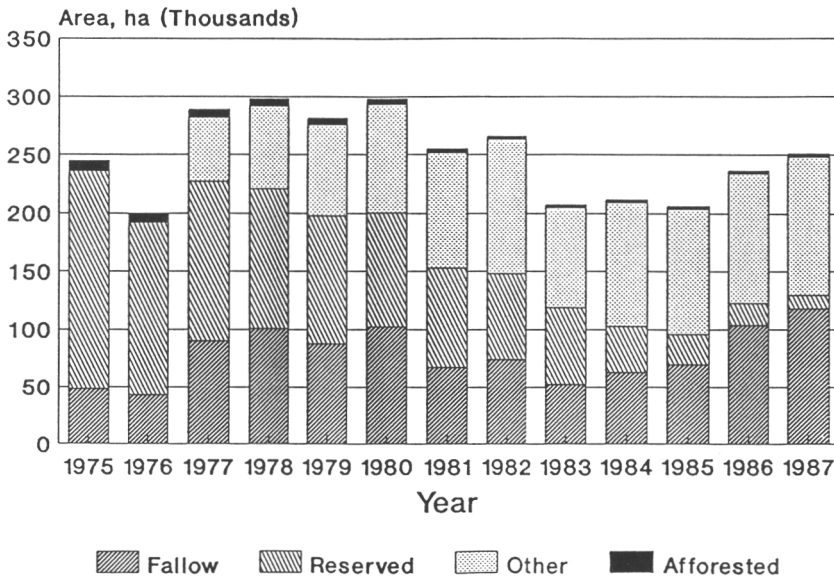


Figure 1. The principal means for the reduction of land area under agricultural production, 1975-87. Source: Yearbook of Farm Statistics.

*Kuvio 1. Tärkeimmät keinot viljelypinta-alan vähentämiseksi, 1975-1987 (Lähde: Maatilatilastollinen vuosikirja).*

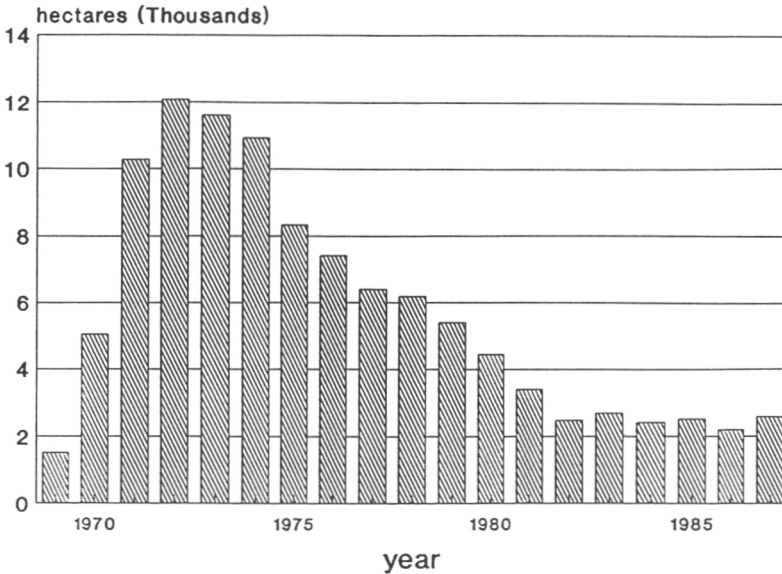


Figure 2. Areas of field afforestation achieved yearly in the private sector between 1969 and 1987 (Source: Yearbook of Forest Statistics 1988).

*Kuvio 2. Yksityisen sektorin peltojen metsityksessä kasvatettu pinta-ala, 1969-1987 (Lähde: Metsätilastollinen vuosikirja 1988).*

The next most significant means of land use control has been fallow. This has accounted for between 2% and 5% of the cultivated area since 1975. In 1980, and from 1984 onwards the statistics include the fallow Field afforestation via the Forest Improvement Act, the Field Reservation Act and the Act Concerning Agricultural production Regulation and Balancing can be seen to be of little areal significance. In other words, as a means to reduce the area of fields under cultivation, field afforestation cannot be considered to have been a great success.

An unspecified area of fields no longer under cultivation is also revealed by Figure 1. This classification seems to account for the fields released from field reservation contracts. It is, perhaps, the most interesting category, as it is the area to which field afforestation extension activities should be directed. The whole category is potential forest land. Of course, given no action at all - agricultural or otherwise - this (abandoned) land will, under Finnish conditions, afforest naturally in a relatively short time. In the next section, closer attention is given to the limited achievements of the afforestation programme to date.

#### 42. Field afforestation

The field afforestation activities examined here are those resulting from subsidies, i.e. natural forest regeneration on abandoned fields is not included in the



analysis. It should be noted, however, that according to the 6th National Forest Inventory, the area of fields regenerated naturally probably exceeds that achieved by subsidized seeding and planting.

The development of field afforestation activities since the introduction of subsidies in 1969 is demonstrated in Figure 2. The Field Reservation Act and the Forest Improvement Act (§6a), together with other production controls, brought a rapid response, so that by 1972 the annual area of field afforestation had reached the sort of level the policy had intended. The response was short-lived, however, and despite increasing incentives, the intensity of field afforestation decreased steadily during the 1970s to stabilize at around 2400 ha/year after 1981.

The intensity of field afforestation showed considerable regional variations, seen in Figure 3. It is clear from the distribution that areas of Finland with strong agricultural traditions, i.e. western and southern Finland, were less responsive to the policy change. Similarly, in northern Finland, where pioneering activities have been part of the post-war culture, responded weakly. Central and eastern Finland, where forestry traditions are strong, and where settled agriculture has a relatively short history, responded most eagerly to the policy means. These regional variations in the intensity of field afforestation were subject to considerable investigation during the 1970s, particularly by the present writer (e.g. Selby 1974, 1980, 1981). The investigations formed a spatial hierarchy, ranging from regional level variations and local level variations at the aggregate level, to farm and field level investigations at the micro level. They were based on, and gave support to, the theory of circular and cumulative causation in spatial social economic development (Myrdal 1957). The theory proved to have considerable utility in explaining spatial variations in the intensity of field afforestation (e.g. Selby 1980).

Whilst the investigations referred to are now over ten years old, preliminary re-estimations of the model based on new evidence of variations in regional development (Varmola 1987, Alueelliset.1988) and the updated figures for field afforestation give no reason to believe that the mechanisms behind the process of field afforestation have changed. Still requiring explanation is the significance of the roles of the assumed mechanisms creating apathy towards field afforestation during the 1980s. Apathy which has persisted despite increasingly generous subsidies.

Of course, afforestation provides income only after a considerable length of time, often a time considered to be beyond the farm owners' time-horizon; afforestation is irreversible within the operational time horizon - farm owners may not wish to foreclose the option to use land for cultivation. There are also positive valuations of the agricultural landscape to be considered, with its implied psychological ties-to-place, which are linked to a reluctance to cancel the pioneering work of past generations. These mechanisms have not received detailed investigation.

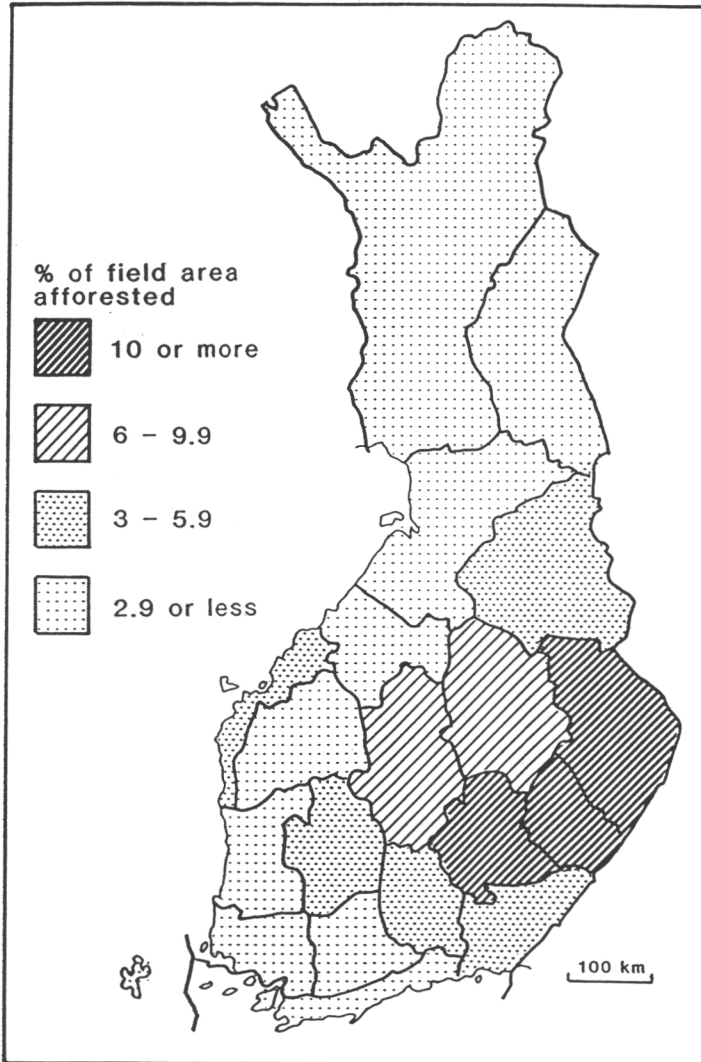


Figure 3. Spatial variations in field afforestation intensity, 1969-87.

*Kuvio 3. Peltojen metsityksen tehokkuudessa havaittavat alueelliset erot, 1969-1987.*

#### 43. Land clearances versus field afforestation

As already noted, the balancing of Finnish agricultural production has not occurred without its contradictions. One such contradiction has been the continuation of pioneering land clearance activities during the 1970s and 80s, despite the official policy of agricultural contraction.

The intensity of field clearances during the period since the introduction of agricultural production regulation in the late 1960s is shown in Figure 4. It might be expected that land clearance was a process to be associated with "agricultural Finland", i.e. the southern and western parts of the country. This is not the case, however. The regions of most intense land clearance are to be found in eastern and northern Finland. In other words, the spatial distribution of the most intense land clearance activities is not dissimilar to the spatial distribution of the distribution of the most intense field afforestation activities. This pattern appears to be contradictory, and will be examined in more detail in a future investigation. Suffice it to note at this juncture that the most likely mechanisms at work behind this seemingly paradoxical situation are i) farm-level clearances to rationalize cultivated land area distribution with the aim of improving farm structure, or to increase the total area of arable land, in the search for "economies of scale". It is also to be noted that in eastern Finland, where field afforestation and land clearance activities have been relatively intense, farms are still rather small and tend to possess a poor land use structure.

A further factor in the recent intense land clearance activities was the decision to delay the introduction of the much publicized, and politically sensitive, Act on Land Clearance Fees for nearly one year, because of a General Election. The

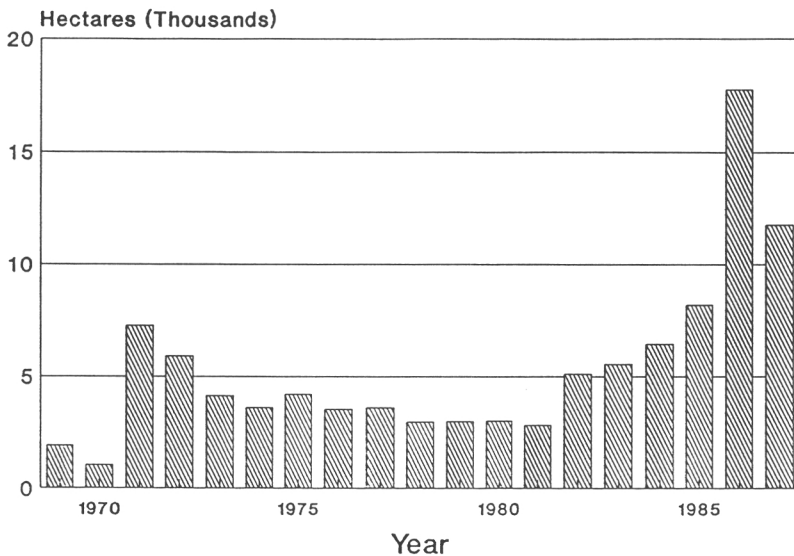


Figure 4. Area of land clearances, 1969-1987 (Source: Yearbook of Farm Statistics).

*Kuvio 4. Pellon raivaukseen käytetty maa-ala, 1969-1987  
(Lähde: Maatilatilastollinen vuosikirja).*

delay led to a land clearance bonanza, with applications to clear over 30 000 ha in 1987. This bonanza was only natural given that the farming community were faced with penalties for delaying any planned clearances activities, which in themselves were prompted by farmers' expectations that field cultivation had a profitable future.

While, for practical reasons, only a third of the applications to clear forests resulted in actual clearance activities during 1987, the years 1984-87 resulted in considerable land clearance activities (Figure 4), while the delay in introducing the legislation paradoxically extended and intensified the land clearance activities in the period 1985-1987. These contradictory trends in land use change are harshly exposed by simply noting that the area of subsidized field afforestation between the years 1969 and 1987 was 108 010 ha while the area of land cleared was 101 849 ha (Figure 5). Thus, the subsidized activity of field afforestation has, in the face of land clearances, achieved a reduction in agricultural land of only 6 161 ha. This very modest achievement has, however, cost the tax payer the subsidies and grants of the Field Reservation Act and the Act Concerning Agricultural Production Reduction and Balancing, as well as the subsidies for materials, labour and repair under the Forest Improvement Act.

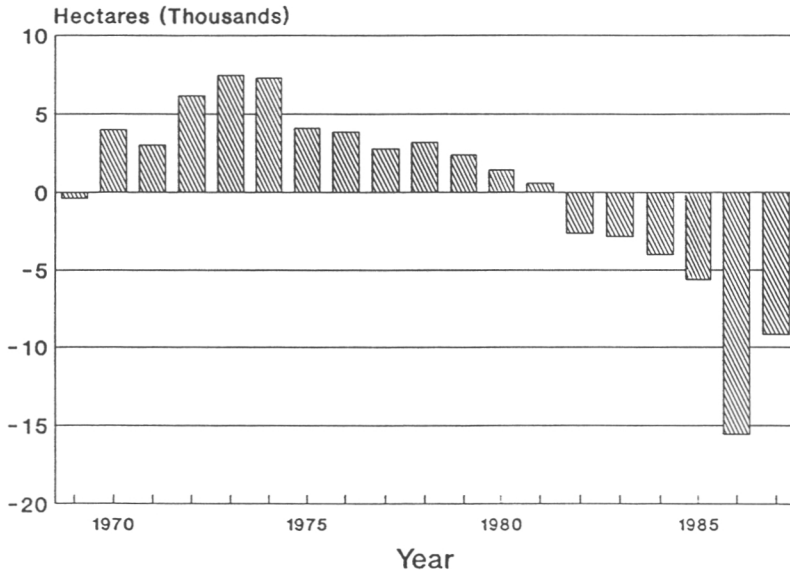


Figure 5. The area of field afforestation minus the area of land clearances, 1969-87. Source: Yearbook of Farm Statistics and Yearbook of Forest Statistics.

Kuvio 5. Peltojen metsittämiseen ja pellon raivaukseen käytettyjen pinta-alojen välinen ero, 1969-1987. (Lähde: Maatilatilastollinen vuosikirja ja Metsätalastollinen vuosikirja).

#### 44. Intensification of the means of primary production

Further to the contradictory trends in land clearance and field afforestation demonstrated above, the regulation of agriculture production by adjusting the area under cultivation has otherwise been unsuccessful. This is because simultaneously with the measure for cultivation restriction under the terms of the Act on Agricultural Production Regulation and Balancing, the agricultural production regulations, e.g. concerning farm taxation, loans, etc., have encouraged a considerable intensification of agricultural production based on the unsustainable use of non-renewable resources. This can be demonstrated by examining the increased use of energy-related inputs to farming (Tables 1 & 2).

Accordingly, there has been a 42% increase in the use of nitrogen fertilizers per hectare during the period 1977 to 1987, Table 1, while Table 2 shows the considerable increase in the use of tractive power and agricultural machinery during the same period - an increase directly contributing to the fixed capital formation in agriculture (discussed by e.g. Toropainen 1990).

In this context, it is interesting to note that while Finnish forestry seeks to intensify the production of wood fibre, the areas fertilized have been considerably reduced (the peak was 232 381 ha in 1973), although forest fertilization remains central to silvicultural improvement measures.

Table 1. The use of agrochemicals as exemplified by the use of fertilizers (Source: Yearbook of Farm Statistics 1988; 95, Yearbook of Forest Statistics 1988; 110).

*Taulukko 1. Väkilannoitteiden käyttö esimerkkinä maatalouskemikaalien käytöstä (Lähde: Maatilastollinen vuosikirja 1988;95, Metsätilastollinen vuosikirja 1988;110).*

Fertilizer year <i>Lannoitusvuosi</i>	AGRICULTURE MAATALOUS		FORESTRY METSÄTALOUS
	1000kg nitrogen <i>Tyypi</i>	kg/ha <i>kg/ha</i>	Forest area fertilized (ha) <i>Lannoitettu metsäala (ha)</i>
1977/78	159 779	69,1	141 342
1980/81	188 457	82,4	87 226
1985/86	196 242	90,0	84 353
1987/88	205 674	98,2	87 118

Table 2. Recent trends in agricultural mechanization and other farm improvements (Source: Yearbook of Farm Statistics 1988; 216 & 255).  
 Taulukko 2. Maatalouden koneellistamisen ja muiden parannusten viimeaikainen kehitys maataloilla. (Lähde: Maatilatilastollinen vuosikirja 1988; 216 & 255).

	1980	1987	Change Muutos 80-87
<b>No. of tractors</b> <i>Traktoreiden</i> <i>likumäärä</i>	218 000	240 000	+ 22 000
<b>No. of farms</b> <i>Tilaluku</i>	224 721	192 244	- 32 477
<b>Cultivated area</b> <i>Peltoa</i> <i>viljelyksessä (ha)</i>	2 304 421	2 243 483	- 60 938
<b>Cultivated area per</b> <b>tractor</b> <i>Viljelty ala traktorilla</i> <i>kohti</i>	10,57	9,34	- 1,23

Gross fixed capital formation *Maatalouden kiinteän bruttomuodostus*

	Machinery and equipment <i>Koneet ja</i> <i>laitteet</i>	Other constructions and land improvements <i>Maa- ja vesirakennukset</i>
1977	51	43
1980	70	63
1985	100	100
1988	113	123

Thus, we meet the same paradoxical situation in agricultural policy that was observed earlier with respect to cultivated area. The intensification of agriculture production has increased continuously during the 1970s and 1980s, but at the same time enormous sums of taxpayers' money have been spent in trying to balance agricultural production (i.e. reduce production to the level of self-sufficiency) and subsidized exports.

The trends outlined in Chapter 4 indicate quite clearly that attempts to control agricultural overproduction by subsidizing the withdrawal of land from cultivation, e.g. via fallow contracts or field afforestation, cannot succeed as long as continuous developments are being made in production intensity.

Against the background of i) conflicting directions in primary land use change in Finland during the Post-war period, ii) the contradictions between measures to restrict the quantity of agricultural production and the simultaneous intensification of agricultural production together with unacceptable levels of agricultural production and export subsidies, the paper now examines possible ways of achieving a more integrated primary land use policy which includes environmental policy into its framework.

## 5 TOWARDS AN INTEGRATED LAND USE POLICY

### 51. Institutional aspects of land use policies

The means to reduce agricultural production which have been attempted over the past twenty years have not achieved the desired results. One reason is that policy means have not been accurately targeted. For example, beyond the investigation of regional variations in the intensity of field afforestation, little is known of the behaviours of the target groups, e.g. no assessment has been made of farmers' motives for adopting production restrictions, or why agricultural policy has failed to curtail farmers who are still willing to clear land at their own expense. Clearly, the agricultural fiscal and price support systems are at odds with the means to reduce production.

Secondly, the agricultural production balancing policies of the 1970s and 80s have aimed at simply reducing the arable area farmed, rather than reducing the intensity with which the land is used. Consequently, the agricultural production restriction measures have not brought about a meaningful, long-term change in agricultural production. This approach does not appear to be solution to agricultural overproduction. Even if a renewed field afforestation programme can be sustained at the intended 10 000 ha/year by 1995, its effect on overall agricultural production will continue to be offset by production intensification, while the increase in roundwood production resulting from field afforestation will be minimal. The cost to the tax-payer of the various levies, subsidies, fees, and tax-relief which the present agricultural production restrictions require will be very high indeed.

Thus, the problem of agricultural overproduction appears to contain two separate processes. First, the policy of self-sufficiency requires agriculture to be maintained at the level required in a hypothetical time of crisis. Secondly, there is the ever-increasing productivity of agriculture. The latter trend is consequent upon increasing capital investments which are financed, to a large extent, by debt (a process supported by the fiscal system and defended by the vested interests of the corporate state).

To be more precise, it can be argued that individual farmers are being quite rational when they maintain, and even increase, the current high level of production. First, this is because producer prices for agricultural products have been totally rationed and perfectly unaffected by competition, as well as being maintained at an artificially high level, in order to sustain the policy of self-sufficiency in a time of crisis.

Secondly, 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.

Thirdly, the power-groups within the corporate state have institutionalized the dependence of agriculture on ever-increasing capital and material inputs, e.g. vested interests which have considerable effect on government policies (i.e. the price and taxation systems noted above) are found to overlap with respect to "farmers' interests" and the supply of machinery and agrochemicals.

Fourthly, regional policy has, for the most part, operated on a system of capital transfers from developed, industrial and urban Southern Finland to the developing (rural) regions. These transfers take place through direct support to rural communes to assist in the maintenance of the socio-economic infrastructure, but also via agricultural and forestry policies in the forms of the support schemes, guaranteed prices, investment grants, tax-relief, silvicultural grants and so on.

It would seem that these regional-cum-agricultural support schemes are partly, perhaps largely, responsible for the contradictory directions in agricultural land use change represented by field afforestation and land clearances, as well as agricultural intensification versus withdrawals of land from agricultural use. These trends result from the lack of integration between agricultural and forestry land use policies. To assist the process of policy integration and implementation, the socio-economic realities of the outcomes of agricultural, forestry and regional development, as well as environmental policies, require more careful examination.

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 we find that 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 uncoordinated, but nevertheless highly centralized 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 coordination and integration (OECD 1988; 68-69).

The centralization of decision making within the state institutions creates a lack of competence and working capacity at the municipal (local) level. Thus, local authorities are often in a weak position when it comes to planning and deciding upon their own environment, and this in turn places a serious constraint on practical conservation strategies for local land use (see discussion in Nord 1987:3, also Weckman 1990).

Given the empirical evidence presented in this paper of clear 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 coordinating their efforts to achieve an integrated land use policy would seem to be remote. Nonetheless, this writer argues that such an integrated land use policy is essential for the future well being of the nation. It might be added that the integration of land use policies, within an environmentally sustainable, multiple use, "landscape ecological" framework transgresses national interests, as the agricultural overproduction and environmental problems discussed here face the whole of Europe, and therefore the whole of Finland's main trading area with respect to primary products.

## 52. Sustainable primary production - a case for land use extensification

### 521. On the concept of sustainability

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, Markandya & Barbier 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 summarized as "constancy of the natural capital stock" (Pearce, Barbier & Markandya 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 summarized by Pearce, Markandya & Barbier (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"). These means will not be discussed further at this juncture, the interested reader is referred to e.g. *Blueprint for a Green Economy* (Pearce, Markandya & Barbier 1989).

## 522. Renewable and non-renewable inputs

Central to the question of the intensified production of primary sector goods is the use of energy. Agricultural (and forestry) employs two different types of natural resources: *renewable resources*, such as cropland, grass land and forests, and *nonrenewable resources* such as fossil fuels which are used for both tractive energy and agrochemicals (Douglass 1984; 11-12). Sustainable primary production, i.e. sustaining a given level of food and fibre production over a long time period, by definition must be based on the use of renewable resources, as the use of non-renewable energy is not sustainable. As Douglass points out (1984; 3) "Some of history's cleverer agriculturalists have found ways to mask the effects of soil loss on productivity by introducing new kinds of crops, new methods of cultivation...new forms of fertilization, new means of controlling pests, and so forth. But few of these devices have succeeded in the long view of history in overcoming the debilitating effects of continuous use for food production."

In section 44, above, the increasing use of non-renewable resources in Finland was demonstrated by the recent growth in the use of agrochemicals (Table 1), which are often oil-based, and require considerable energy in their production, distribution and broadcasting, and the increasing use of tractive power and machinery (Table 2).

The continuing increase in the use of non-renewable resources in Finnish agriculture not only creates overproduction and its attendant problems, but it is also very detrimental to the environment. In other words, it is damaging the renewable resources which are required for sustainable development. For example, increasingly powerful and heavy tractors damage both soil structure and soil quality soil by the process of compaction (see e.g. Soane, Dickson & Campbell 1982, Briggs & Courtney 1989), which in turn requires an increased use of agrochemicals to off-set the resulting loss in natural fertility. Similarly, excessive energy inputs in the form of agrochemicals (both fertilizers and pesticides) have seriously damaged both surface and groundwaters, in turn leading to water biomass disturbances (*ibid.*).

Intensive silviculture also require considerable inputs of energy and oil-based agrochemicals which threaten the environment no less than intensive agriculture. Indeed, silvicultural intensification programmes, notably forest land drainage and fertilization, have caused considerable damage to water systems, as well as to sensitive habitats. Forest roads and intensive harvesting practices, as well as monocultures, have also damaged both ecosystems and landscapes (e.g. Reunala & Heikinheimo 1987, cf. Kuusela 1990).

Damages to the renewable resources of primary production are currently corrected by the application of increasing quantities of non-renewable resources (energy and materials), which are expensive and which therefore damages the national economy. These increased expenditures can, of course, be offset against farm or forest taxation (the state therefore forfeits taxation revenue). On the other hand, the increased productivity resulting from the inputs of non-renewable resources requires expensive agricultural balancing expenditures and export subsidies which are both politically and economically troublesome.

### **523. The extensification of primary production**

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 & Courtney 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 U.S. agriculture 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 agro-chemicals. The savings of oil-products and energy being achieved by simplified low or non-tillage operations which bypass the plow. 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 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 over-production. 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.

Summarizing 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* rather than *intensive* agriculture would require more land to maintain any desired production level, thereby reducing the area of "surplus" agricultural land, while maintaining "stewardship" of the agricultural cultural landscape (a topic to which the discussion will shortly return).

In the following sections, various approaches to the integration of primary land use policies will be discussed, albeit simplistically. The concept of sustainability of production is assumed to underline the discussion. However, the discussion is widened to include not only 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.

### **53. 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 (Suomen ympäristöpolitiikka 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.

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, (ibid; 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 alters 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, see e.g. Sievänen 1987. In agriculture, however, the multiple use principle is still very foreign, even in the presence of the right of access (everyman'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 recognize the task of agricultural landscape conservation in agricultural production and environmental policies (Suomen..1988;124 and Komiteanmietintö 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 the 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 themselves, 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 (but see e.g. Kasal 1976). Possible frameworks for such investigations are outlined in the remainder of this chapter.

#### 54. Land use and the landscape

As Meeus et al. (1988; 33) correctly remind us, landscape, as such, is a natural resource for the production of food and a place of human use. This explicitly concurs with the argument in section 5.3 that agricultural land must also be brought in the multiple use planning equation. Cultural landscapes are the product of the historical interaction of human land use and nature. Cultural landscapes are therefore more than the sum of parts - geology, topography, soils, vegetation, etc. They are a dialectic outcome of the interaction of man and his environment. "Landscape management is the most expressive product of culture" (Fernandes (1987, cited by Meeus et al. 1988; 33). Fernandes (*ibid.*) 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) present a landscape typology for Europe, based on spatial and functional factors, which identifies 13 major landscape types (*ibid.*; 37). The typology is still under development, but the aim is to examine the long-term effects of agricultural use on different landscapes. Such knowledge is urgently required. As Meeus et al. (*ibid.*; 58) note with concern, a number of European landscapes are under undergoing considerable, often irreversible, transformations because of changing agricultural practices (intensification, scale increase, abandonment). Landscapes with frail ecosystems and little resilience are threatened with disintegration, for example the fragile bocage landscapes of rural Finland?

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 agriculture (see e.g. Vaníček 1969, Goode 1969, Kasal 1976, Leonard & Stoakes 1977, Traill 1988, Potter 1990, see also OECD 1989b; 20, 51-55). Similar problems face Finnish agriculture, although the situation has not reached critic proportions in Finland, yet.

In any event, it seems clear that the agricultural landscapes of most regions of Europe and Scandinavia are undergoing change as a result of the intensification and extensification of agriculture. By the year 2000 many landscapes will, in fact, be totally transformed (Meeus et al. 1988; 66). These changes are resulting in conflicting social objectives, especially between agricultural production, ecological stability, leisure activities and tourism (*ibid.*; 73), which is

compounded by the need to decrease surpluses on the agricultural market, to protect the natural environment and manage the social problems inherent in socio-economic decline in peripheral regions (CEC 1985).

As noted in section 53, Finnish environmental policy recommendations tacitly recognize the need for a multiple-use agricultural land use policy aimed at landscape conservation, and as such 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 emphasizing an ecological approach to landscape management.

The relatively young, multi-disciplinary science of landscape ecology addresses the landscape as a system of species and habitats, as well as energy and material flows which manifest themselves in spatial phenomena - natural, economic, aesthetic and otherwise (see e.g. Vink 1983 and Forman & Godron 1986, as well as Meeus et al. 1988 and Kinnunen & Sepänmaa 1980). The landscape ecological approach to integrated land use planning clearly has utility; a utility well demonstrated by Bruns (1988), Bruns & Luz (1988, 1989) and Bruns et al. (1988). For example, Bruns & Luz (1988, 1989) present two scenarios of land use development, one based on the segregation of various specialized types of land use; the other based on the integration of different types of land use.

The process of *segregation* is based on agricultural land use trends to date, i.e. the polarization of land use functions. The segregation is not only functional and ecological, but it is also aesthetic, economic and social. The "good" land is segregated from "the bad", the latter forming ecological reserves, but reserves only for those species which adapt to habitats represented on "marginal" land.

It is interesting to note that in the United Kingdom, the solution to the conflicting demands of conservation and intensive agriculture are being sought by *increased segregation*. It is suggested (e.g. Willerby (1983; 43-45) that fertile lowlands of low relative relief and gentle topography should be given over to intensive farming. The landscapes so created would be dominated by open, well tilled fields. Footpaths (i.e. access) and wildlife would be kept to a minimum. Land for conservation of species and public access would be confined to land "in a permanent state of low fertility". Those farmers wishing to follow a conservationist line have "to fight *against* CAP price signals and exhortations to become even more intensive and ruthless as crop and livestock producers" (Willerby, 1983; 44).

The process of *integration*, on the other hand, is based on land use de-intensification. Rather than taking large areas or entire regions of marginal (agricultural) land out of production, inputs of energy and agrochemicals would be reduced throughout the whole land. The nature of an integrated landscape, i.e. resulting from an integrated land use policy would be as follows (Bruns & Luz 1989):

- agricultural production would continue to be widespread and would also extend to the marginal regions;
- low-input agricultural management would be developed, thereby arresting the deletion of soils, pollution of groundwater and the destruction of natural habitats, etc.
- the landscape would include networks of habitats, fields, forests, hedgerows, "nature reserves" on selected sites set aside from "commercial production" to create habitats for animals and plants within patterns of agricultural land.
- the agro-industrial growth centres would be the target for restoration schemes with the aim of reducing the effects of monoculture, and the restoration of habitat networks.

However, it should be stressed that i) landscape rehabilitation measures are only possible at the local level, i.e. individual parcels of land only can be considered. Landscape planning therefore becomes part of local politics, and ii) it is important to remember that most people object to restrictions to their personal freedom of choice and action. This is particularly true for land owners and farmers, and land management in cultural landscapes, i.e. an integrated land use policy, requires the cooperation of just these people (Bruns & Luz 1988; 8-10 and Bruns et al. 1988)

Bruns et al. (1988; 21) argue that (landscape) planners, in their role of realizing land use integration, are not very influential because for the farmer, economic compensation and not planning is the important motivation to change a management technique; "In order to make ecosystem restoration acceptable, subsidies need to be redirected to programmes which encourage fertilizer and pesticide reduction. Prices for agricultural products could be adjusted to quality, instead of quantity, and the application of agrochemicals could be taxed."(ibid.)

A step in this direction has been taken in Finland with the introduction of a tax from the beginning of 1990 on phosphate-containing agrochemicals, although primarily as a means to reduce damage to water systems. However, it should be noted that any policies oriented towards environmental protection and the reduction of agricultural production through a reduction in intensity (read inputs) will be ineffective as long as distorting effects of agricultural price support, subsidies and fiscal policies remain unchanged.

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! Certainly, 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 activities (e.g. Lovén 1973 & 1974 and Savolainen & Kellomäki 1981, see also Axelsson-Lingren & Sorte 1986 for an significant Swedish contribution). 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).

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 an irreversible process, while at the same time landscape is a valuable commodity with a number of functions; functions which have been well summarized by Leonard and Stoakes (1977) in the context of agricultural change. The landscape, they argue (ibid; 128-130) that the landscape can be valued in seven ways:

- As a record of the past: the landscape contains historical features which are worthy of conservation as they form a link with the past;
- 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 "idealized" rural past;
- As an artform 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).

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 (Lovén 1973 & 1974, Savolainen & Kellomäki 1981 and Axelsson-Lindgren & Sorte 1986 are examples Scandinavian contributions, the U.S.D.A., Forest Service 1973, 1974 represent an example of the American approach). 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 fragile 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.

### **55. Some research recommendations - the need for a behavioural approach to land use policy integration**

The discussion has outlined various approaches towards achieving integrated land use - agricultural, forestry and ecological. These approaches each require further investigation, and it would be unrealistic to argue that Europe is close to achieving an integrated land use policy. It is clear, also, that any progress towards a multiple use landscape, planned along sound ecological principles, cannot be achieved by any one country in isolation. Environmental problems, no less than economic or social ones, are rarely contained by national or regional borders.

A recent paper by Richardson-Flack (1990) addresses this problem by reviewing environmental problems on a global basis. Her short but disturbing paper, while recognizing the universal validity of environmental problems, admits that not all policy ideas or approaches to rural land use are transferable between regions (*ibid*; 5). Based on considerable professional experience, Richardson-Flack (*ibid*; 9-11) presents a number of recommendations for addressing policy research priorities. Some of these are now summarized and placed in a Finnish context, as they form an essential starting point for tackling the integration of land use policies, both regionally and nationally, as well as internationally:

- i) there is a need for accurate, integrated data on economic, environmental and social issues based on Geographical Information Systems. Research also needs to learn to "Ask the right questions" in an interdisciplinary context.
- ii) By implication, Richardson-Flack argues that the multiple use principle now applied to forests should be applied to a wider "Greenspace policy", which should apply as much to easements on individual holdings as to national parks, or European greenbelts.
- iii) How can European regional policies concerning land use and forestry be developed to better integrate with agriculture and rural development? (Scandinavian countries, it would seem, might act as a starting point.)
- iv) Policy research is required on the most effective way to combine forestry,

agriculture, the assessment of critical ecological areas, historic preservation and other aspects of "our newer understanding of what makes economic, ecological and social communities sustainable in the future".

v) Research is also required on the most appropriate forms of government administrative structure, both at the local and international level. "This research, and possible plans for reconstruction, must take into consideration the enormous potential of local leadership initiatives in the implementation of policy".

vi) Research is needed on the most effective ways to educate citizens in policy development and implementation (see section 3.5, on the behavioural considerations of change).

The priority given to these various research task will certainly vary from country to country, and will also depend upon the various interactions between research institutions and politics. In Finland, topics *ii - vi* would appear to be the most fruitful starting points.

Topic (*ii*) is pertinent to Finnish conditions. Having a well established research tradition in multiple use forestry, it would not require major efforts to apply the multiple use principle to a wider set of activities. Topic (*iii*) is also well understood in Finland, as forestry and agriculture have, until recently, been integrated into the farm economy. On the other hand, the idea of small scale forestry is only just beginning to be revived in central Europe. Finland can make a clear contribution in this field (compare e.g. Small scale forestry...1988 and Countryside Commission 1983). Topics (*iv-vi*) require a more fundamental re-orientation of the research tradition in Finland: topic (*iv*), of course, follows from topics (*ii & iii*), but topic (*v*) is politically more sensitive, but nonetheless important for that. It is an area which must be studied and understood objectively, because it is through the administrative and political channels that change is transformed from "ideals" to "practical reality". Similarly, topic (*vi*) is central to a new approach to rural land use. Any progress as a result of research into policy issues (topic *v*) will fail to materialize if the common man does not "identify" with a) the changes required of his behaviour and values, and b) why such changes are required. Similarly, research topics (*i-ii*) support the contention (in section 54) that decision makers have an imperfect knowledge of the landscape preferences of the common man. What is a well-tended landscape, what are the principles of "stewardship"? These are key behavioural questions. Research into the "willingness-to-pay" for the conservation of, e.g. the agricultural landscape, would provide some answers, but before one can assess willingness to pay, more information is required concerning the kinds of landscapes which are valued and those which are not. Thus, while topics (*i-v*) are institutionally oriented in that various forms of policy research are implied, topic (*v*) clearly presents a problem for behavioural research.

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* (see e.g. Bruns & Luz 1988; 15, Nassauer 1988; 973-977, as well as Heidegger 1947 and Relph 1981)). 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 others*. Stewardship is, then, more than just "good husbandry", which 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.

Related to distrust, there is the question of *identification*. For example, the processes of *segregation* and *integration*, discussed in section 54, may be perceived differently by different social groups, e.g. farmers, rural citizens or urban tourists, who will *identify* with these processes in various ways (measured on a continuum from total acceptance to total rejection). Planners, agricultural and forestry advisors, etc. will also identify with these processes in different ways, thereby affecting the attitudes and perceptions of their target groups.

Following distrust and identification, there is the behavioural problem of *acceptance* (Bruns & Luz 1988; 12-13). This requires that people become *aware of their actions* and the effect they have on their environment. They either *accept* that an action has negative effects with respect to the given target, and change their behaviour; or they are unaware of the consequence of their actions or do not accept that their actions are harmful.

The changes required of both individual and interest group attitudes in order to achieve the necessary institutional framework for an integrated land use policy, not to mention its realization, would seem to create the greatest initial barrier to the fulfillment of such a policy.

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 of change.

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## SELOSTE

### Suomalainen maankäyttöpolitiikka: hajaannuksesta yhtenäisyyteen?

Jo 1960-luvun alun Suomessa uskottiin, että viljelykelpoinen maa takaisi 90% omavaraisuuden peruselintarvikkeiden tuotannossa (Komiteanmietintö 1960:9, Komiteanmietintö 1961:1). Pellon raivauksen lisääntymisen katsottiin uhkaavan kasvavaa metsäteollisuutta. Heikinheimo ym. (1963) totesivat, että peltomaa-alan lisääminen kasoattaisi elintarvikkeiden vientiä ja siihen liittyvät vaikeudet. Kuitenkin vasta 1960-luvun lopulla ryhdyttiin toimenpiteisiin viljelymaa-alan supistamiseksi ja vuoteen 1980 mennessä vähennys oli noin 400 000 hehtaaria. Nyt 1990-luvun alussa viljelymaa-alan vähennystarve on 700 000 hehtaaria, koska kasvavat maatalouden pääomainvestoinnit ovat parantaneet maatalouden tuottavuutta vuodesta 1967 lähtien, viljelymaa-alan vähenemisestä huolimatta.

Kolme tärkeintä keinoa vähentää viljelymaa-alaa ovat olleet pellonvaraus sopimukset (1969-1988), kesannointi ja muut vuosittaiset sopimukset, joita määrittelee laki maataloustuotannon ohjaamisesta ja tasapainottamisesta (1977/446) sekä peltojen metsitys, jota määrittelevät vuoden 1967 metsänparannuslain useat pykälät (kuvio 1).

Valtion avustuksella vuonna 1969 aloitettu peltojen metsitys saavutti huippunsa vuonna 1972 ja väheni sen jälkeen päätyäkseen 1980-luvulla n. 2 500 hehtaariin vuodessa (pienää kasvua on odotettu vuosille 1988 ja 1989). Peltojen metsitys ei onnistunut pääsemään vauhtiin 1980-luvulla, huomattavista palkkioiden ja avustusten noususta ja kalliista kampanjoinnista huolimatta.

Samaan aikaan 1970-luvun lopulla ja 1980-luvun alussa pellonraivaus pysyi n. 4 000 hehtaarin vuositasolla (kuvio 4). Pellonraivausmaksulaki viivästyy vuoden 1988 eduskuntavaalien vuoksi. Seurauksena oli pellon raivausboomi, joka teki tehottomiksi valtion yritykset lisätä peltojen metsittämistä.

Vuosina 1969-1987 n. 108 000 hehtaaria peltoja metsitettiin valtakunnallisen suunnittelun puitteissa, mutta samalla ajanjaksolla pellon raivaus vaati n. 102 000 hehtaaria metsää (kuvio 5).

Tätä taustaa vasten, viitaten maankäytön muutoksiin liittyviin ongelmiin sekä maatalouden jatkuviin ylituotanto-ongelmiin ja valtion liiallisiin tuotantotukiaisiin, ottaen huomioon myös liiallisen vientituen (kaikki OECD'n arvostelema), tässä tutkimuksessa arvioidaan mahdollisia keinoja kokonaisvaltaisemman maankäyttöpolitiikan toteuttamiseksi.

Ensimmäisenä tarkastellaan maankäyttöpolitiikan lainsäädännöllistä puolta ja osoitetaan, että maanomistajat reagoivat enemmän tai vähemmän rationaalisesti "systeemin" tarjoamiin yllykkeisiin nykyisen maa- ja metsätalouspolitiikan ja aluepolitiikan puitteissa. Tässä yhteydessä osoitetaan myös, että voimassa oleva maankäyttöasioiden vastuun jakaantuminen useiden ministeriöille ei johda kokonaisvaltaiseen maankäytön suunnitteluun.

Intensiivisen maatalouden vähentäminen on yksi ratkaisu ylituotanto-ongelmaan. Sitä harkitaan vakavasti Keski-Euroopassa. Ekstensiivisen maankäytön etu verrattuna intensiiviseen maankäyttöön johtuu sen yhteensopivuudesta ympäristöpoliittisten vaatimusten kanssa (mm. pienempi energiankulutus ja vähemmän kemiallisia tuotantopanoksia). Ekstensiiviseen maatalouteen siirtymisestä aiheutuvien pienempien hehtaarisatojen vuoksi suurempi maa-ala on tarpeen tuotannon säilyttämiseksi ennallaan. Intensiivisen maankäytön tarpeiden ulkopuolelle jäänyt viljelymaa-ala voisi hyvin soveltua tähän tarkoitukseen.

Kokonaisvaltaisen maankäyttöpolitiikan avain on monikäyttöperiaatteen soveltamisessa maa-alaan yleensä, ei ainoastaan metsiin. Viljelymaa-alan monikäyttöpolitiikassa ympäristönsuojelullisilla näkökohdilla tulisi olemaan suuri merkitys (ks. Ympäristöministeriö 1988:124 ja Komiteanmietintö 1989:9;93). Niitä tulisi huomioida erityisesti maisemallisesta ja ekologisesta näkökulmasta. Intensiivisestä maataloudesta luopumiseen liittyviä ympäristönsuojelullisia näkökohtia voidaan soveltaa myös intensiivisen metsätalouden yhteydessä.

Vähemmän intensiivisen, ekologisesti järkevän ja kokonaisvaltaisen maankäyttöpolitiikan behavioristiset seuraukset ovat huomattavat. Maaomaisuuden "huolenpitoperiaatetta" ("stewardship") pitäisi soveltaa enemmän. Maanomistajien täytyisi kuitenkin saada taloudellisia yllykkeitä, jotta he ryhtyisivät noudattamaan ympäristöystävällisiä "huolenpitoperiaatteita", koska sen seurauksena saattaa olla tulojen pieneneminen. Taloudellisesta tuesta olisi sekä aluepoliittista että ympäristö-poliittista hyötyä. Ruotsissa on todettu, että kansalaisilla on selvästi "maksuhalua" (willingness to pay) paremman ympäristön hoitoon, erityisesti jos maaseudun maisemallinen puoli on otettu huomioon (Drake 1987).

Paljon on vielä tekemättä kokonaisvaltaisen, ympäristöystävällisen maankäyttöpolitiikan taloudellisten ja käyttäytämisen parametrien määrittämiseksi. Työssä tarkastellaan, kuinka Richardson-Flackin (1989) esittämät tutkimusehdotukset soveltuisivat Suomen oloihin.



**METSÄNTUTKIMUSLAITOS  
KANSANTALOUELLISEN METSÄEKONOMIAN TUTKIMUSSUUNTA**

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