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Abstract

The objective of the evaluation of the effects of national aids for Southern Finland was to clarify the application of aid measures belonging to the aid scheme agreed in 1999 (Commission Decisions 97/428/EC and 2000/167/EC) and the effects on the integration of Finnish agriculture into the common agricultural policy. The evaluation is made by MTT Economic Research on the basis of an assignment of Ministry of Agriculture and Forestry. The integration of Southern Finland's agriculture and producers into the EU's agricultural policy has been evaluated by examining price integration, the structural development of agriculture, disadvantage resulting from natural conditions and its effects and the profitability of production as well as related factors. Due to small farm size and the disadvantage resulting from natural conditions, production costs are high in Finnish agriculture, which is why higher levels of aid than in other EU countries are required in order to achieve profitable production.

Research results show that Finland's agricultural products market has integrated into the EU's common market such that price information about price changes occurring elsewhere in Europe is communicated quickly into Finland. The development of Finnish agricultural input prices has mainly followed the development of comparison countries. The impact of Finland's northern location on agricultural and horticultural production has been examined on the basis of panels of experts organised by MTT Economic Research. Natural disadvantage is evident throughout all agricultural production, lowering outputs while increasing costs at the same time. In addition to the disadvantage resulting from natural conditions the competitiveness of agriculture is declined by the small farm size. Increasing of the farm size is difficult for the relative small size of field parcels which is especially typical for the northern parts of the country but also for Southern Finland as well as forested areas and versatile structure of landscape. Despite the rapid structural development, the average farm size in field hectares in the AB area is 20-50% smaller than in Sweden, Germany or Denmark.

By means of the increase in farm size the income level of agriculture has been mainly maintained, but the profitability of production has not increased accordingly. Rapid structural development has not achieved a very significant rise in productivity in the agriculture of the AB area. Farmers' incentives to invest and expand production refer mainly to the pursuit of scale advantages in the production. National aid has had a decisive significance in the formation of agricultural income and in safeguarding the continuity of agriculture and horticulture in the area. A survey of farmers conducted in autumn 2002 shows that farmers themselves also emphasise the importance of income supports as a factor influencing investment decisions. According to forecast results for the period 2001-2003, national aid covered approximately 40-70 % of family farm income received as compensation for work and own capital invested on cattle and pig farms, the whole of family farm income and also part of production costs on egg and broiler farms, around 30 % of family farm income on cereal farms, and the whole of family farm income in greenhouse enterprises. The proportion of family farm income accounted for by national aid in the period 2001-2003e has fallen in all production sectors except for cereal and pig farms.

For Finnish agriculture the agriculture and horticulture of the AB support area is highly significant because, depending on the production sector, the area represents 25-75% of Finland's livestock production, more than 90% of wheat, malting barley and sugarbeet production, more than half of horticultural output, and 40-75% of the production of the other key crops. The country's largest food industry processing plants and food factories are located in the area. A significant number of companies that manufacture production inputs are also located in the area. The operations of these companies strongly rely on the area's diverse agriculture and horticultural production.

The importance of preserving a managed rural and cultural landscape is emphasised in Southern Finland as a counterweight to the presence of the large population centres. The AB are is also very important for tourism. The objective is to maintain the continuity of historical land use and the cultural history of the area also in future by keeping them in agricultural production.

Index words: agricultural structure, farm structure, structural change, agricultural financial policy, profitability, farm income, economic integratio

Etelä-Suomen kansallisten tukien vaikutusten arviointi

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Tiivistelmä

Arvioinnin tavoitteena oli selvittää vuonna 1999 sovittuun tukijärjestelmään (komission päätökset 97/428/EY ja 2000/167/EY) kuuluvien tukitoimenpiteiden toteuttamista ja vaikutuksia Suomen maatalouden yhdentymiseen yhteiseen maatalouspolitiikkaan. Tukivaikutusten arviointi on tehty MTT taloustutkimuksessa MMM:n toimeksiannon pohjalta. Etelä-Suomen AB-tukialueen maatalouden ja tuottajien yhdentymistä EU:n maatalouspolitiikkaan on arvioitu tarkastelemalla tuottajien toimintamahdollisuuksiin vaikuttavina tekijöinä hintaintegraatiota, maatalouden rakennekehitystä, luonnonolosuhdehaitan vaikutuksia ja tuotannon kannattavuutta sekä näihin liittyviä tekijöitä.

Tutkimustulosten mukaan Suomen maataloustuotteiden markkinat ovat integroituneet EU:n yhteismarkkinoihin siten, että hintainformaatio muualla Euroopassa tapahtuvista hintamuutoksista välittyy nopeasti Suomeen. Suomen maatalouden panoshintojen kehitys on pääpiirteissään seurannut vertailumaiden kehitystä. Suomen pohjoisesta sijainnista johtuvan luonnonhaitan vaikutuksia on tarkasteltu arvioinnissa MTT taloustutkimuksen järjestämiin asiantuntijapaneeleihin perustuen. Luonnonhaitta ilmenee kautta koko maataloustuotannon vaikuttaen samalla alan tuottoja alentavasti ja kustannuksia lisäävästi. Luonnonhaitan lisäksi maatalouden kilpailukykyä Suomessa rasittaa pieni tilakoko. Tilakoon kasvattamista vaikeuttaa peltoviljelyn osalta myös Etelä-Suomen alueella tyypillinen suhteellisen pieni lohkoko ja alueen metsäisyys ja maiseman monimuotoisuus. Vaikka alueen rakennekehitys on ollut nopeampaa kuin eräissä muissa EU-maissa, tästä huolimatta keskimääräinen tilakoko peltohehtaarina AB-alueella on 20-50 % pienempi kuin Ruotsissa, Saksassa tai Tanskassa.

Tilakoon kasvun myötä maatalouden tulotaso on pääsääntöisesti pystytty säilyttämään, mutta tuotannon kannattavuus ei ole noussut tilakoon kasvua vastaavasti. Nopealla rakennekehityksellä ei myöskään ole saavutettu kovin merkittävää tuottavuuden nousua AB-alueen maataloudessa. Viljelijöiden kannusteet investoida ja laajentaa tuotantoaan liittyvät pääosin skaalaetujen tavoitteluun tuotannossa. Kansallisella tuella on ollut ratkaiseva merkitys maataloustulon muodostumisessa ja alueen maa- ja puutarhatalouden jatkuvuuden turvaamisessa AB-tukialueella. Syksyllä 2002 tehdyn kyselyn mukaan viljelijät ovat myös itse korostaneet tulotukien merkitystä investointipäätöksiin vaikuttavana tekijänä. Vuosien 2001-2003 ennakollisten tulosten mukaan Etelä-Suomen kansallinen tuki kattoi viljelijäperheen työlle ja pääomalle korvaukseksi saadusta maataloustulosta alueen nautakarja- ja sikatiloilla karkeasti 40-70 %, kananmuna- ja broileritiloilla koko maataloustulon ja lisäksi osan tuotantokustannuksista, viljatiloilla noin 30 % maataloustulosta ja kasvihuoneyrityksissä koko maataloustulon. Kansallisen tuen osuus maataloustulosta on vuosina 2001-2003e vähentynyt vilja- ja sikatiloja lukuun ottamatta kaikissa tuotantosuunnissa.

AB-tukialueen maa- ja puutarhataloudella on Suomen maatalouden kannalta erittäin suuri merkitys, sillä tuotannonalasta riippuen alue vastaa 25-75 %:sta Suomen kotieläintuotannosta, yli 90 %:sta vehnän, mallasohran ja sokerijuurikkaan tuotannosta sekä yli puolesta puutarhatuotannosta ja 40-75 %:sta eräiden muiden keskeisten viljelykasvien tuotannosta. Alueella sijaitsevat maan suurimmat elintarviketalouden jalostuslaitokset ja ruokatehtaat. Myös merkittävä määrä tuotantopanoksia valmistavista yrityksistä sijaitsee alueella. Hoidetun maaseutu- ja kulttuurimaiseman säilymisen merkitys korostuu Etelä-Suomessa vastapainona suurten väestökeskusten sijainnille. Alue on myös matkailun kannalta erittäin tärkeä. Alueen maankäytön historian jatkuvuus ja kulttuurihistoriallinen arvo halutaan ylläpitää pitämällä alueet maataloustuotannossa.

Asiasanat: maatalouden rakennepolitiikka, tilarakenne, rakennemuutos, maatalouden tukipolitiikka, investointituki, tuotantotuki, maatalouden tulopolitiikka, kannattavuus, maataloustulo, taloudellinen integraatio

Foreword

The purpose of evaluating the impacts of the national aids paid in southern Finland was to find out how the aid scheme introduced in 1999 (Commission Decision 2000/167/EC) has influenced the integration of Finnish agriculture to the common agricultural policy. In the evaluation the integration of producers in Article 141 was considered to refer to the operating conditions of Finnish producers and their adjustment to the economic environment under the common agricultural policy of the EU. The factors influencing the adjustment examined in the evaluation are price integration, structural development of agriculture, impacts of natural handicap on the production costs and profitability of the production.

The evaluation of the impacts of the aid is based on the statistics and registers on agriculture and horticulture, negotiations on the aids under 141 carried out at the Agrifood Research Finland during 2003, results of studies launched at the Department of Economics of the University of Helsinki and Pellervo Economic Research Institute, as well as other studies on the impacts of the aid. The survey of the impacts of the natural handicap is based on panel discussions between experts representing different production sectors. The assessment of the structural change is based on the farm data of the Information Centre of the Ministry of Agriculture and Forestry, and incomes and profitability were examined on the basis of the results of the bookkeeping farms of the Agrifood Research Finland and information of the Statistics Finland based on taxation data.

The Ministry of Agriculture and Forestry commissioned the Agrifood Research Finland to carry out the evaluation, and the Ministry also financed the project. The evaluation report was compiled at the Agrifood Research Finland by Professor Maija Puurunen and Researchers Mika Hirvijoki, Harri Turunen and Johan Åberg. The technical implementation of the project was supervised by a steering group appointed by the Ministry of Agriculture and Forestry, chaired by the Head of the Income Support Section Esa Hiiva. In addition to the personnel of the Agrifood Research Finland, various other parties contributed to the evaluation by producing information on the significance of agriculture and horticulture in southern Finland and their multiplier effects in the whole society. We wish to thank the steering group and all parties involved in the evaluation work and drafting of the report.

The evaluation report was submitted to the Ministry of Agriculture and Forestry and the Commission in 2003 as set down in the Commission Decision. The report was also translated into English. The report is published in both Finnish and English as an electronic publication in the Agrifood Research Finland's Working Papers series.

Helsinki, January 2004

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1 Introduction

Due to unfavourable natural conditions arising from a northern location and owing to the structure of agriculture that has developed through history, the cost level of agricultural production in Finland is high and production is not possible at market prices without aid. When Finland joined the European Union in 1995 it became a member of the common market at the same time. As far as agriculture and the food industry is concerned, Finland is a typical integrator in the common market, because the agricultural products that Finland produces amount to 1-2% of the total agricultural production of the 15 countries of the EU. In agricultural production, producer prices fell substantially more than prices of inputs as a result of entry into the common market and the price formation that prevailes there. The aid scheme for agriculture was reformed in Finland according to the EU's aid scheme applied in agricultural policy, and this was further supplemented by a national aid scheme.

In addition to the aid scheme wholly or partly funded by the Community, Finland received in the Act of Accession the opportunity for a five-year transition period, for which product-specific transition period aids, which would decline in size annually, were prescribed for the whole country. The transition period aid in the central and northern, C support areas, of the country was gradually replaced with national long-term northern aid. The problems arising from the lowering and cessation of the transition period aid in the southern, A and B support areas, of the country remained subject to aid decisions to be negotiated separately with the Commission. Fundamental aspects behind the Act of Accession at that time were the opportunities for the southern parts of the country to integrate with the Community's agricultural policy. To ensure the continuation of agriculture and its long-term integration with the Community's agricultural policy, the Act of Accession of Finland incorporated a separate Article 141 on national aid schemes. (Act Concerning the Conditions of Accession 1994, Kettunen & Niemi 1994, Kettunen 1996, 1996a, 1997, Puurunen 1998).

Based on Article 141, Finland has twice agreed with the Commission national aid for areas A and B. The aid decision agreed in 1996 related to the period 1997-1999 (Commission Decisions 97/428/EC and 97/449/EC) and the other aid decision, agreed in 1999, to the period 2000-2003 (Commission Decision 2000/167/EC, as amended by 2000/364/EC).

Under the Commission's decisions, the granting of aid has been justified because Community measures together with the Act of Accession and other actions have proved to be insufficient to avoid serious difficulties. Due to climatic conditions, as well as to the small size of farms and the high levels of fixed costs, the profitability of agricultural production in Southern Finland is very poor. In this situation the cessation or sudden reduction of aid would have caused serious difficulties by lowering the incomes of farmers significantly and by endangering the continuation of agriculture in southern parts of the country.

In connection with the first aid decision, attention also focused on the need to grant aids to improve the structure of agriculture so that they help to maintain and improve existing

production methods. A precondition for developing the structure of agriculture, however, is safeguarding the income development of farmers and the profitability of agriculture. In this respect, the transitional and degressive direct income support in Commission Decision 2000/167/EC was seen as a necessary addition to the structural policy supplementing the structural adaptation of agriculture under the Commission's Decision. The total amount of production eligible for aid in Southern Finland is less than one per cent of the Community's production in all relevant sectors, and thus it has no significant impact on the Community market.

This evaluation of the effects of national aid payable in Southern Finland has been prepared to fulfil the reporting need mentioned in Article 4 of Commission Decision 2000/167/EC. The objective of the report is to examine the effects of the aid measures outlined in the Decision of 2000 in the period 2000-2003 and to provide information on the integration of agriculture into the common agricultural policy. As the effects of solutions relating to the structural development of agriculture on agricultural profitability and farmers' incomes appear over the longer term, when examining the income development of agriculture the report has focused on a period covering the whole duration of Finland's EU membership. In terms of the final years of the evaluation period, the study has been restricted by delays in the completion of available statistics and other data sources, and only preliminary results can be presented for agricultural income development. The Ministry of Agriculture and Forestry is preparing a separate study on the enforcement of aid schemes and the amount of aid paid.

1.1 Commission Decisions relating to aid for Southern Finland

Calculations made in connection with the membership negotiations showed that Finland's agriculture needs special arrangements to be able to operate in the common market. Finland's objective was to obtain a long-term national aid scheme for the whole country. The outcome of the negotiations was that the Commission authorised degressive transitional aid for the whole country for the period 1995-1999, long-term northern aid for Central and Northern Finland, as well as aid for serious difficulties under Article 141. Article 141 of the Act of Accession was the decisive factor in reaching a negotiation result for the whole of agriculture.

Article 141 of Finland's Act of Accession reads as follows:

Where there are serious difficulties resulting from accession which remain after full utilisation of the provisions of Articles 138, 139, 140 and 142, and of the other measures resulting from the rules existing in the Community, the Commission may authorise Finland to grant national aids to producers so as to facilitate their full integration into the common agricultural policy.

The 1996 aid decision (Commission Decisions 97/428/EC and 97/449/EC) included both income support types of measures and measures to develop the structure of and the operating conditions for agriculture.

Based on Commission Decision 97/428/EC, the Commission authorised the following measures:

Based on Article 141 of the Act of Accession for the period 1 January 1997 to 31 December 2001

- Art. 1 (a) increased investment aid
- Art. 1 (b) temporary income support in case of change of production

Based on Article 88 of the Treaty (formerly Article 92) for an indeterminate period

- Art. 2 (a) aid for the diversification of production
- Art. 2 (b) aid for permanently giving up agricultural production
- Art. 2 (c) additional aid to young farmers
- Art. 2 (d) aid for the development of quality systems
- Art. 2 (e) national aid for crop production

In respect of livestock farming, greenhouse production and storage aid for horticulture, the decision was based on the increasing of transitional aid in the period 1997-1999 (Commission Decision 97/449/EC).

Based on Article 3 of Commission Decision 97/428/EC, Finland delivered to the Commission in summer 1999 a report on the impact of measures authorised in 1996 and entered into negotiations on a continuation of the aid scheme from 2000. The aid package that arose on the basis of the negotiations (Commission Decision 2000/167/EC, as amended by 2000/364/EC) includes the opportunity, under Article 1 (a) of the Decision, to pay direct aid for animal husbandry, greenhouse production and storage of horticultural products for the period 1 January 2000 to 31 December 2003 on the basis of Article 141 of the Act of Accession. The Commission Decision stated that of the measures set out in Commission Decision 97/428/EC, the aid for the development of quality systems referred to in Article 2 (d) of the Decision and the additional aid referred to in Article 2 (e) of the Decision would continue. In addition, the Commission extended the authorisation period for the investment aid referred to in Article 1 (a) of the Decision until 31 December 2003. In accordance with a notification submitted to the Commission, Finland ceased the application of the other aid measures mentioned in Decision 97/428/EC, because their significance was minor or they were replaced by measures under the new Council Regulation (EC) 1257/1999 on the development of rural areas.

1.1.1 Basis of the evaluation and technical implementation

According to Article 4 of Commission Decision 2000/167/EC issued in connection with the 1999 aid decision

No later than 30 June 2003, Finland shall provide a detailed report on the application of the measures authorised by Decision 97/428/EC and by this Decision, and their effects on the integration of Finnish agriculture into the common agricultural policy.

In relation to this the Ministry of Agriculture and Forestry (MMM) has given MTT Economic Research the task of preparing an evaluation of the effects of 141 aid for Southern Finland and an evaluation report. MTT Economic Research was the Agricultural Economics Research Institute (MTTL) until 1 March 2001, at which time it merged with the Agricultural Research Centre to create MTT Agrifood Research Finland. MTTL was earlier and still remains a research unit of MTT, as an independent research institute belonging to the administrative sector of the Ministry of Agriculture and Forestry and mainly funded from the state budget.

Professor Maija Puurunen, who was responsible for the preparation of the report, as well as Researchers Harri Turunen, Johan Åberg and Mika Hirvijoki participated in the evaluation of the 141 aid measures within MTT Economic Research. The evaluation is based on statistical material and research publications available at the time of the evaluation. When preparing the report, the authors also took into account research projects under way relating to Southern Finland's need for aid.

1.1.2 Objective of the evaluation and frame of reference

The objective of the evaluation is to clarify the application of aid measures belonging to the aid scheme agreed in 1999 (Commission Decision 2000/167/EC) and the effects on the integration of Finnish agriculture into the Common Agricultural Policy. Article 141 concerns the full integration of producers into the EU's Common Agricultural Policy. The wording of the Article "integration of producers into the EU's agricultural policy" is in this evaluation interpreted in practice to mean the operating opportunities for Finnish producers and their integration into the economic operating environment under the EU's agricultural policy. Price integration, the structural development of agriculture and the profitability of production have been examined as factors effecting the integration of producers' operating opportunities. Price integration includes the integration of both producer prices and inputs into the common market, whereupon price changes would be reflected freely throughout the common market. The structural development of agriculture and increasing the efficiency of production include the pursuit of scale advantages in agriculture and at the same time the possibility of reducing costs per product unit. On bigger farms profitability is usually better, and this is evident, for example, in the results of profitability bookkeeping in agriculture (Bookkeeping Farm Results 2000, Puurunen 2002). A condition of structural development, however, is producers' future expectations for returns on investments, i.e. the profitability of production.

Owing to adverse natural conditions, production costs are high in Finnish agriculture and thus higher levels of aid than in other EU countries are required. The profitability of agricultural production is influenced by changes in price and cost levels, as well as by the structural development of agriculture and the increasing of production efficiency through technological advances. For the individual producer the level of prices and costs, just like the level of aid, is externally determined; the producer can only influence the revenue and costs of his farm through the choices he makes. Against that, producers decide on structural development in accordance with their price, cost and aid assumptions and profitability expectations. Farmers can also select where possible from the available technological solutions. Thus structural development depends not only on the present profitability of production, but also on producers' profitability expectations. On the one hand, profitability improves through structural development and these two factors form a virtuous circle that increases the growth of the enterprise and its financial success. On the other hand, weakening profitability can halt structural development and, if it continues longer term, can push even large production units into decline.

The effects of the structural development of agriculture do not extend only to basic agriculture; it also has an impact on the entire regional economy. The existing sector structure is one of the most important reasons for regional differences, for example in relation to the sectors of new lines of business (Spilling 1997). Agriculture is the biggest single rural industry in the Southern Finland area. Many other lines of business are directly dependent on it. Agriculture also has a very significant indirect influence on the regional economy of rural municipalities through, among other things, its investments. Furthermore, the farm economy has high potential as a foundation for establishing new rural businesses (Carter 1998, Alsos et al. 2002).

The evaluation examines whether the aids based on Article 141 of the Act of Accession have had impacts on the production, farm structure and profitability of farm enterprises situated in the A and B support areas, and how these impacts have also been reflected in the socio-economic development of the areas. In terms of aids for livestock and crop production as well as investment, the evaluation examines the level of profitability at which farms have operated, how fast structural development has been achieved on these farms and how integration has progressed compared with other Member States. The evaluation focuses particularly on the structure of agriculture and the development of profitability as well as on the significance of income support as a requirement for profitable production and structural development. As far as the farming population is concerned, the effects and significance of the aid scheme on the farm level in different production sectors is evaluated. In terms of the multiple effects of agricultural aids on the regional economy and the welfare of the population outside farms, conclusions could only be made indirectly, taking into account the significance of the agriculture and food industry in the region.

1.1.3 Structure of the report

The aid measures included in the 1999 aid package, their weighting and application in the years 2000-2003 have been examined briefly in the final part of the introduction. To clarify the integration trend, the report has examined in Section 2 the theory of the economic integration of two areas, the evidence of integration in practice and the indicators used in its evaluation. Section 3 of the report describes quite extensively the production conditions in which agriculture is practised in the AB support area and the significance of agriculture in the AB support area during the period that the 141 aid measures were in effect. Initially Section 3 examines the natural production conditions for agriculture in the AB area compared with the nearest Member States, as well as the production structure of agriculture and horticulture in the area and its development, and it also outlines the national economic significance of Southern Finland's agriculture and food industry. When examining the socio-economic significance of agriculture, attention has been paid to the characteristic features of the area as the location of Finland's largest population centres, to employment, to the age structure of the population and to migration in different types of rural areas. Section 3 also examines certain indicators that describe the change of the state of the environment in the area, because although only aid for crop production of the 141 aid measures requires agri-environmental support commitments, 93% of the area's farms and 97% of the arable land falls within the sphere of agri-environmental support.

Section 4 examines the structural change of agriculture and horticulture in the AB support area in the years 1997-2001 in different production sectors and compares it with the situation of certain other Member States. The significance of investment aids is examined as a factor influencing the growth in farm size. The same section also focuses on the productivity development of agriculture achieved with structural measures and other measures aimed at increasing production efficiency. Section 5 examines by production sector the revenue, cost, income and profitability development of agriculture and horticulture on AB area farms. Section 6 examines the dependency between the income and profitability development and the structural development of agriculture and evaluates the significance of 141 aid in the income and profitability development of farms and horticultural enterprises as well as in their structural development. Section 7 contains the conclusions and a summary of the effects of the 141 aid measures.

1.2 Forms of aid authorised in the 1999 round of negotiations and methods of evaluating their effects

Here follows a brief presentation of the forms of aid authorised in the 1999 round of negotiations and their implementation as well as their weighting in the evaluation of the effects of aid. In addition, there is also a statement of the key research materials and concepts by which the effects of the aid measures have been examined in the report. Income and profitability concepts are presented in more detail in Appendix 3. The amounts of aid paid will be reported in a separate study of the Ministry of Agriculture and Forestry.

The evaluation of the effects of aid is based on an examination of structural development and financial results of farm groups collected from sampled farm statistics and registers. To a certain extent results based on surveys of farmers are also available. The problems of agriculture resulting from natural conditions have been examined with the aid of panels of experts from different production sectors. The result memoranda of the panels of experts have been available for this evaluation. The socio-economic development and significance of agriculture in the AB area can be outlined on the basis of certain research studies on population changes and by examining the development of regional economies.

1.2.1 Forms of aid in Commission Decision 97/428/EC

Investment aid

Based on Article 1 (a) of Commission Decision 97/428/EC, the Commission gave Finland permission to grant for the period between 1 January 1997 and 31 December 2001 aid of at most 50% of the total cost of investments for the pigmeat, poultrymeat and egg sectors and at most 75% for other sectors to farmers with a development plan for investments in primary production (on-farm agriculture and horticultural activities) which do not entail an increase in the total production capacity of the sectors existing at the date of Decision 97/428/EC. However, the individual maximum limits laid down by Commission Decision C (96) 733 shall be observed. Pursuant of Article 1 of Commission Decision 2000/167/EC the period of validity of the aid has been extended until the end of 2003.

Article 1 (a) of Commission Decision 97/428/EC meant the opportunity to pay increased investment aids in support areas A and B. Finland used this opportunity in the years 1997-1999. The aid decisions in respect of some of the applications instituted in 1999 were made in 2000. Investment aids for agriculture granted on the basis of applications which were instituted after the beginning of 2000 have been granted as state aids for the development of agriculture in support area A and B based on Commission Decision N97/00. This Commission Decision allows, in Finland's view, the support of investments to the extent considered necessary nationally, taking into account the national funding available and the national view that the levels and terms of investment aid must be consistent throughout the entire country.

The number of farms that have received investment aid and the magnitude of investment aid in different production sectors are obtainable from the 'Rahtu' register on funding support, maintained by the Information Centre of the Ministry of Agriculture and Forestry (TIKE). The allocation of investments in the AB area and the investment plans of farmers and the significance of aid in them are examined, drawing upon an extensive survey of farmers conducted in autumn 2002 by a private market research institute. MTT Economic Research has studied the implementation of farmers' investments and investment plans from profitability bookkeeping farms (the material includes FADN farms). The effect of investments on farm profitability is also examined based on certain studies conducted using

the Rahtu register and on the profit development of profitability bookkeeping farms which have invested.

The effects of investment aids on the integration of the AB support area's agriculture into the common agricultural policy is examined in the report indirectly via the structural development of the area's agriculture and horticulture. A benchmark for structural development is the structure of farms and horticultural enterprises and its development in Sweden, Denmark and Germany. A structural comparison of agriculture is made based on Eurostat structural statistics for 1997 and 2000. When forming conclusions about the structural development of agriculture, it is necessary at the same time to focus attention on the income development of farmers and prospects for the profitability development of agriculture, which farmers use as a basis for making their investment decisions.

Aid for the development of quality systems

Article 2 (d) of Commission Decision 97/428/EC allows aid to be granted for the development of quality systems so that the costs compensated can be at most 100% for training and technical assistance services and 70% for quality control. In practice the development of quality systems has been supported in connection with the implementation of the National Quality Strategy for the Food Sector as part of the Regional Rural Development Programme (ALMA). Investments made to develop quality systems have been studied in this evaluation report only by examining briefly below the setting of objectives for quality systems and farms' participation in quality work.

Work on the development of quality systems has been done for national motivations substantially more widely than the reference made to it in Commission Decision 1997/428 EC, prepared on the basis of Article 141. Assisted by an EU pilot study, a start was made in 1997 to develop a National Quality Strategy for the Food Sector, which also covers the quality work carried out on farms. The National Quality Strategy for the Food Sector was published in 1999 and it is based on consumer-oriented quality work along the entire food chain. Its objective is to have in 2006 the entire food chain operating within the framework of an unbroken and transparent quality system.

The quality system development funds have been used to prepare a quality system and manual suitable for farms based on the ISO 9000 standard, to develop the content and quality of training for farmers and to organise training for farmers. By the end of 2002, around 12,500 farmers and entrepreneurs of small rural enterprises had participated in such training. In terms of farms, the objective means that all farms that supply products to industry, to the trade or direct to the market will be brought within the sphere of systematic quality work by 2006. (Karjalainen MMM).

National aid for crop production

Under Article 2 (e) of Commission Decision 97/428/EC, additional aid for crop production, hereinafter *national aid for crop production,* can be paid to farmers who participate in the agri-environmental support programme for mainland or Åland Islands agriculture, or are committed to complying with corresponding terms and conditions. The Decision defines the maximum amounts of support by region and by crop group. The Commission stated in its Decision 2000/167/EC that the aid is compatible with the common market and continues to be authorised in accordance with Decision 97/428/EC.

The evaluation of the effects of national support for crop production is based on an income and profitability examination of FADN bookkeeping data in which the significance of this aid is examined as part of aids paid in the AB area. An income and profitability examination has been conducted separately for cereal farms as well as for sugarbeet and potato farms and outdoor vegetable cultivation with more limited data. On the basis of FADN data is possible to compare for the most part only cereal farm results with the corresponding results of the nearest Member States.

1.2.2 Forms of aid in Commission Decision 2000/167/EC

Article 2 of Commission Decision 2000/167/EC mentioned and defined in more detail in its Annex I aids under Article 141 by product for the period 1 January 2000 to 31 December 2003. The aid can be granted for milk, suckler cows, bulls, slaughter heifers, ewes and nanny goats, pigs, laying hens and other poultry, horses, greenhouse production and storage of horticultural products. In archipelago areas additional aid can be paid for bovine animals and ewes. Higher levels of aids for milk, pigs and laying hens can be paid in the Åland Islands and the outer archipelago. In the period 2000-2003, aid for milk has been determined per kilo of milk, aid per animal for slaughtered heifers and other livestock aids per animal unit. Greenhouse aid is per square metre and horticultural storage aid has been differentiated according to storage type and is paid per storage cubic metre.

In the previous programme period, 1997-1999, aid for bovine animals was paid as slaughter animal aid. Article 3 of Decision 2000/167/EC and its Annex II mention additional aid per bull, which it was possible to use in the first half of 2000 to compensate for losses resulting from the change in the aid scheme from slaughter-related aid to aid per animal unit. In the report these aids are included within the AB area animal unit aid in the production sector income and profitability examination.

The effects of the aids on the integration of the AB support area’s agriculture into the common agricultural policy are examined in the report indirectly via the income and profitability development of the area’s farms and horticultural units. The perspective therefore is the investment incentive required by the structural development of agriculture for income and profitability development. Income and profitability development is studied

by production sector using FADN bookkeeping farm data. In those production sectors in which the number of the area's FADN farms is insufficient, the examinations are based on taxation data (MYTT). The latter are statistics based on the tax details for agriculture and forestry of around 9,000 farms and they are maintained by Statistics Finland. MYTT can be used to examine agricultural income but not profitability.

1.2.3 Amount of aids agreed in connection with the 1999 decision paid in 2000-2003

National aids for Southern Finland were paid in 2000-2003 in accordance with the result of the 1999 negotiations. In Finnish mark-euro conversions of unit aid level authorisations relating to 2002 and 2003 have been applied the rounding method agreed in connection with the Decision (2002/404/EC) on northern aid and a euro exchange rate with the Finnish mark of 5.94573. Data for 2000 and 2001 have been converted into euros to facilitate comparisons.

Aid totalling 925 million euros has been paid in the 2000-2003. The most significant aid item consists animal husbandry income supports, but their level has fallen annually through lower unit aid authorisations. In the amounts of unit aids paid for products, the Commission Decisions have been complied with in all years.

Table 1. The amount of aids included in the 1999 aid decision paid in the AB support areas in the period 2000-2003e (million euros) (Ministry of Agriculture and Forestry).

	2000	2001	2002	2003e	Total
Commission Decision 97/428/EC					
Art. 1 (a) Investment aids [1) 2)]	36.1	9.6	11.0	11.0	67.7
Appropriated loans	91.4	85.4	93.2	93.0	363.0
aids linked to loans	23.6	21.0	23.5	23.5	91.6
Investment aids and aids linked to loans	59.7	30.6	34.5	34.5	159.2
Art. 2 (d) Aid for the development of quality systems	1.2	1.2	1.5	1.5	5.4
Art. 2 (e) National aid for crop production	45.4	50.4	60.4	65.2	221.4
Commission Decision 2000/167/EC					
Direct aids					
aid for animal husbandry	119.2	113.3	112.5	111.4	456.4
aid for greenhouse production	19.0	19.5	19.6	19.9	78.0
aid for storage of horticultural products	1.1	1.1	1.1	1.2	4.5
Aids total	245.6	216.1	229.6	233.7	924.9

[1)] Application period of the aid based on Article 1 (a) of Commission Decision 97/428/EC has been continued to 31 December 2003 on the basis of Commission Decision 2000/167/EC.

[2)] For the applications left in 2000-2003 investment aids in A and B support areas have been granted on the basis of Commission Decision N97/00. The figures for 2000 also include aid granted on the basis of Article 1 (a) of Commission Decision 97/428/EC for which the aid application was submitted in 1999.

2 Economic integration of two different areas

According to Article 141 of the Act of Accession, the Commission may authorise Finland to grant national aids to producers so as to facilitate their full integration into the common agricultural policy where there are serious difficulties resulting from accession which remain after full utilisation of other aid schemes and the provisions of the Community. Thus Article 141 clearly refers to the integration of two different economic areas and this must also be a starting point when evaluating the effects of aids. The economic integration of two areas is examined below with the aid of the relevant literature. Finland's integration into the common market has been studied utilising research on the reflections of price changes between the member countries.

2.1 The theory of the economic integration of two areas

2.1.1 The benefits and drawbacks of integration

Trading between areas is considered to be a good thing, because production transfers from the areas of high costs to producers which produce the commodity more cheaply. On the other hand, in a custom union resources are allocated against the comparative advantage and the utility of the economic integration of the areas depends much on the mutual marketing arrangements of union partners (Jackob Viner, cf. El-Agraa 1982). Later models of economic integration examine the dynamic effects of integration. Instead of the opportunities for trading, these models focus on an examination of opportunities for the allocation of resources.

Jovanovic (1992) classifies the dynamic effects of economic integration as follows:

1. Increased competition improves efficiency and maintains a more competitive market. Thus e.g. monopolies are removed and a lowering of costs and prices reduces inflation pressures.

2. As the market grows, companies have the opportunity to exploit increasing returns to scale, which in turn increases wage levels, standard of living and gross domestic product. Through the growing market, companies' opportunities for specialisation also improve.

3. If the economically integrated countries are large enough, they together have the opportunity to influence production and export prices, and to improve their trade balance.

4. The opportunities for economically integrated countries to influence the location and size of investments grow.

5. Production costs of public goods can be lowered.

6. Adjustment to economic integration can also result in costs, which have to be taken into account when evaluating the benefits and drawbacks. The reallocation of inputs is not always a painless and easy process; it often requires time and administrative intervention.

Economic integration does not necessarily benefit all parties in the same way and to the same extent, in which case it can become problematic for the different parties to remain in the union (Jovanovic 1992). El-Agraa (1982) observes, however, that in reality nearly all economic integrations have been founded more on political than economic factors. Jovanovic presents a number of factors that promote the success of economic integration. Economies should be of similar size and at a similar stage of development; a small country takes a big risk by entering into a union with the economy of a country significantly larger than itself. The economic area formed should be sufficiently large. Geographical proximity has a positive influence on economic integration, as the benefits don't disappear in transportation costs. The cultural and social backgrounds should also be similar. Moreover, it is easier to establish an economic union during a period of affluence and growth than during an economic recession.

When economic integration has advanced from customs union to common market or economic union, even larger benefits can be achieved through a common monetary and finance policy as well as through common objectives such as full employment, better economic growth and income distribution (El-Agraa 1982). Monetary integration improves the integration of the goods, service and production factor markets, whereupon the union's internal allocation of resources is improved. Jovanovic (1992) states that taxes have a distorting effect on free trade and the allocation of resources and considers that the harmonisation of tax policy will facilitate the achievement of greater benefit from economic integration.

2.1.2 The characteristic features of economic integration

When two markets are integrated, a change in one market area results in a change in price in the other market area. Price differences between any two areas that trade with each other cannot be greater than the transportation costs between the two areas. The price difference between the areas allows for arbitrage, by which efforts are made to exploit the different prices for different goods in different localities. Arbitrage, however, leads before long to the balancing out of price differences and brings the arbitrage gains to an end. The markets are thus said to be regionally integrated. (Bierlen et al. 1998).

The physical movement of goods alone does not guarantee that the areas belong to the same market area. In an integrated market area, prices do not change independently of each other, because information coming in to the market has a convergent effect throughout the market area. As Bierlen et al. (1998) state, if the price of two or more areas change independently of each other, then

1) the areas represent an autarchy, i.e. they don't trade with the other areas,
2) there are significant barriers to arbitrage in the markets,
3) imperfect competition prevails in one or more areas, and/or
4) the products of different areas are not perfect substitutes for each other.

All the factors that influence trade between markets also influence the integration of the markets. The obtaining of price information and the opportunity for transports are the biggest external factors that influence price behaviour. In principle, distance should not be a barrier to market integration, even though it may slow integration and the balancing out of prices that accompanies trade.

2.2 Integration of Finnish agriculture into the EU's agricultural policy

2.2.1 Factors influencing the integration of Finland

In 1995 Finland joined the European Community and since then it has participated in advancing the integration of the Community in a way that promotes the movement of work, capital and goods, and more recently by participating in the monetary union. In its influence on European Community's policy preparation processes and decision-making, Finland belongs to the so-called small Member States. Finland's opportunities to influence EU decision-making depend on the activity of the Finns themselves, because Finland has only a small number of votes (on the EU Council Finland has 3 votes out of 87 and on the Commission one Commissioner out of 20).

As far as Finnish agriculture is concerned, integration meant the economic integration of a sector that operates in essentially very harsh conditions and dominated by small farms into a large Community that possesses very good production areas. Furthermore, to succeed in the competition within the EU's internal market the productivity growth of agriculture would have to be continually higher than in Europe's best agricultural areas, which in itself is improbable. The problem of Finnish agriculture is adapting to changes in the economic operating environment while working within the framework of a permanent disadvantage given by natural conditions. The profitability problems resulting from this natural disadvantage were addressed before EU membership through producer prices and subsidies.

Economic integration, however, requires price and cost adjustment, whereupon operators in Finland inevitably come up against the high cost level of agriculture resulting from natural conditions. In terms of animal diseases Finland has enjoyed a better situation and stricter controls than in the common market. With regard to salmonella, for example, Finland received, in order to maintain its favourable disease situation, permission to apply certain statutes relating to diseases that were tighter than EU standards in the production chain and import of meat and eggs. The programme has extensive economic effects, which have been

closely monitored and assessed. Finland's salmonella programme has been shown to a good example of maintaining public health in a financially profitable way (Maijala & Peltola 2003).

Finland's integration into the common agricultural policy has been evaluated below by examining the implementation of a uniform price level, i.e. market integration, and also the implementation of an aid policy that compensates for natural disadvantage. In respect of market integration, the report examines Finland's agricultural market. An indicator of market integration is the uniformity of prices and the rapid reflection of price changes from larger areas of the internal market. The speed of reflection of price changes has been studied in Finland. Jalonoja's and Pietola's study (2002) on the functioning of the food potato market suggest that price falls in the core areas of the internal market are reflected in a more rapid way than rises in prices.

As a geographically remote, small market area, Finland occupies the role of a price adapter, because its own impact on the price development in the extensive market of the EU is very minor. Taking into account the transportation costs and the small market, it could be said that if changes that occur in the prices of agricultural products and inputs are reflected from the innermost areas of the internal market rapidly into Finland and the economic disadvantage resulting from Finland's natural conditions and unfavourable farm structure is taken fully into account in EU aid policy, then Finland's agriculture has integrated into the Community's agricultural policy.

2.2.2 The integration of producer prices

2.2.2.1 The development of agricultural consumer prices

After Finland joined the European Community, the price determination of agricultural products changed from agriculture-oriented to consumer-oriented, in other words the change in the food chain was rather fundamental (Myhrman 1994, cf. Puurunen 1999, p.130). Finland had no transition period to adjust to the Community's price level, which meant an immediate and greater than anticipated fall in market prices and sales revenue at the beginning of 1995. The price of milk fell 32%, beef 38-43%, pork and broiler meat 52%, eggs 68%, bread grain 63% and feed grain by 58%. Average producer prices of agricultural products fell as a consequence of EU membership by 38%, according to the producer price index. The estimated fall in prices used in determining the size of the aid package was less than the actual fall for all the main agricultural products, excluding milk, bread grain and broiler meat (Table 2).

Table 2. Anticipated and realised producer prices (euros/l, euros/kg) of certain agricultural products during EU membership, 1994-2002. (MMM, Tike).

		Price before EU membership	Anticipated EU price	Realised prices				
					Average			
			1995	1995	1995-99	2000	2001	2002e
Milk	e/l	0.49	0.34	0.34	0.34	0.35	0.36	0.37
Beef [1]	e/kg	4.16	2.69	2.56	2.41	2.29	2.33	2.24
Beef, bulls[2]	”	4.65	3.20	2.65	2.49	2.37	2.43	2.34
Cow’s meat	”	3.46	2.35	2.07	1.74	1.48	1.45	1.15
Pork	”	2.74	1.41	1.24	1.27	1.27	1.49	1.40
Mutton	”	4.07	2.83	1.69	1.55	1.68	1.89	2.05
Broiler meat	”	2.25	1.04	1.08	1.13	1.11	1.17	1.21
Eggs	e/kg	1.48	0.87	0.48	0.64	0.82	0.69	0.76
Wheat (bread grain)	e/kg	0.37	0.13	0.14	0.00 0.14	0.12	0.12	0.13
Rye (bread grain)	”	0.38	0.13	0.14	0.14	0.12	0.12	0.12
Malting barley	”	0.31	0.14	0.13	0.14	0.12	0.12	0.12
Barley (feed grain)	”	0.27	0.13	0.11	0.12	0.11	0.10	0.10
Oats (feed grain)	”	0.26	0.13	0.11	0.11	0.11	0.10	0.09

[1] Beef without cow’s meat
[2] Bulls, carcass weight over 130 kg

In 1995 the producer prices of agricultural producs fell 38% and the input prices 20%. Figure 1 presents the Producer Price Index (PPI) and its subindices in 1995-2002, and as a comparison the index of purchase prices of production factors, i.e. Input Price Index (IPI). The indices are nominal and they do not include fur production (cf. Section 2.2.2.2). In 1995-2002

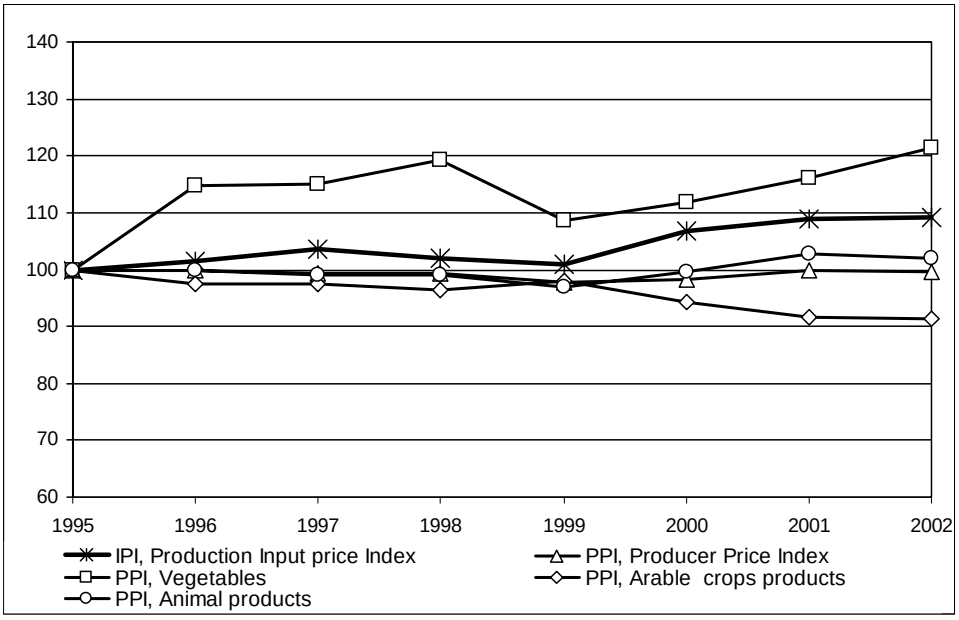

Figure 1. The Agricultural Producer Price Index (PPI, whole index) and its subindices as well as the Production Input Price Index (IPI) in 1995-2002 (1995=100). (Statistics Finland).

the Producer Price Index has not changed much; it has declined 0.5%. At the same time, the Input Price Index rose by around 9%. Prices of the livestock products fell in the period 1996-1999, but they rose, mainly due to better prices for pork, in 2000-2001, only to a fall again in 2003. Prices of arable products (not including fresh vegetables and berries) fell in 1996 by over 3% in addition to the price drop of 1995, and in 2002 the price was nearly 10% lower, than in 1995. The price development for vegetables has been better than other producer prices. In 1999 prices of vegetables fell about 8%, but since then their prices have risen.

2.2.2.2 Agricultural producer prices compared with EU countries' producer prices

During EU membership the market prices of agricultural products have evened out; Finnish milk producers receive roughly the same market price as in a number of other EU countries. The fluctuations in the market price of pork have been generally less than in many EU countries, because, among other things, most of the production remains in the domestic market. On the other hand, overproduction of eggs and market problems with sheepmeat have kept the prices of these products low. Prices of grains fell immediately to close to the EU intervention price and they have fluctuated near the intervention price, mainly depending on domestic supply and demand conditions. In 2002, prices of bread grains were in Finland 30-35% and barley 7% above the intervention price (Table 3) (Finnish Agriculture 2003).

The development of agricultural producer prices, and of the prices of purchase inputs in the following section, has been compared between Finland and EU countries in the period 1995-2001 based on Eurostat price monitoring. This encompasses price changes of agricultural products and inputs in the EU area. Fur production is also included with the agricultural sector in Eurostat price monitoring. In fur production, prices fluctuate more than in basic agriculture. The weighting of fur production in Finland's Agricultural Products Price Index is around 12%, so price fluctuations in the fur sector can change the points of the overall index. Of the comparison countries, fur production can also have a marginal influence on the overall index in Sweden. The Eurostat price index is real, i.e. an inflation correction has been made to it using the Consumer Price Index.

Table 3. Market prices of grains and the most important livestock products in Finland and in selected EU countries in 2002. (Finnish Agriculture 2003, Eurostat).

Market prices of grains, €/1000 kg [1)]				
	Rye	Wheat	Barley	Oats
Finland	131,02	134,87	108,25	110,83
Sweden	105,43	112,00	102,13	103,88
Denmark	95,86	112,20	121,22	114,27
Germany	94,77	109,88	96,72	103,18
France	98,83	103,22	101,75	123,67
England	-	119,60	98,47	105,13
Spain	134,37	144,20	131,37	142,67
Interven-tion price	101,31	101,31	101,31	-

[1)] January-June.

Market prices of livestock products, €/100 kg [1)]				
	Milk	Pork	Broi-ler meat	Eggs[2)]
Finland	33,51	145,22	120,22	78,89
Sweden	31,75	143,47		97,19
Denmark	32,43	129,18	116,02	
Germany	29,48	138,56	136,00	104,18
France	29,07	131,69	130,01	63,75

[1)] January-September.
[2)] Prices converted into these per kilo according to average weight of 62 g/egg.

Thus, in the comparison presented below, agriculture is included within a wider sector than in other contexts in this report. Agricultural producer prices fell in the first years of membership a little more quickly than e.g. in Germany and in Denmark or in the EU15 on average. In 1999 Finnish producer prices did not fall quite as much as in the comparison countries and thereafter they have risen, but by less than in Denmark, for example. Although the fur industry may possibly have caused an additional fluctuation in the index where Finland is concerned, overall the trend of Finnish producer prices has been slightly more stable during membership than in other Member States (Figure 2).

In spite of the EU agricultural policy's pursuit of stable and uniform market prices, there have also been strong price variations between the old Member States. Price variation is caused, among other things, by changes in demand and supply, consumer habits, the competitiveness of product processors (and the entire food chain) relative to manufacturers of import products, the degree of interaction between agricultural production and the food industry, and possible market disruptions. In addition, prices can be influenced more than might be supposed by the demand and supply situation of local markets than by possible external competition, as has been apparent, for example, in the development of prices for Finland's production during the early stages of membership. (Niemi 1999).

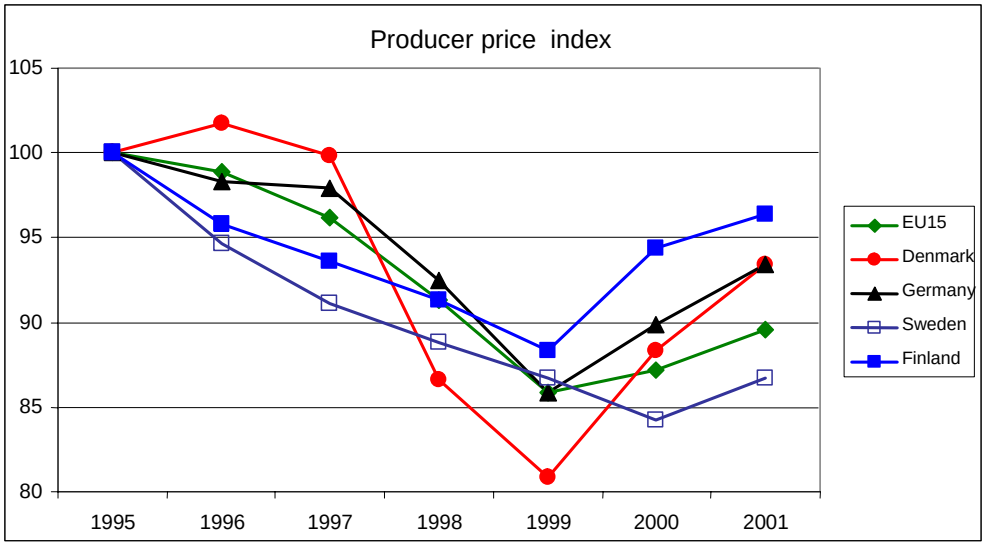

Figure 2. Changes in real agricultural producer prices in Finland and in comparison countries in the period 1995-2001 (1995=100). (Eurostat).

2.2.3 The integration of input prices

2.2.3.1 The development of agricultural input prices

In the first year of EU membership, input prices fell in Finland by an average of around 20%. The fall in input prices was smaller than anticipated and took place over a longer period. In 1994-1995 input prices fell as follows (MMM, Statistics Finland):

Change of prices, %	Anticipated	Realised
Purchased feeds	-40	-29
Purchased seeds	-36	-35
Purchased animals	-33	-30
Fertilisers	-27	-17

Of the inputs presented above, the observed fall in prices for purchased feed and fertilisers was 10% smaller than the figure used in determining the size of the aid package. These inputs are very significant for the production costs of livestock farms, and fertilisers also for the production costs of arable farms. The greater than anticipated fall in producer prices together with input prices remaining at a higher level have adversely affected the income and profitability development of agriculture in the early years of EU membership (Puurunen 1999). Changes in the income and profitability of agriculture have been examined more closely in Section 5 of the report.

There had been big changes in fertiliser prices in the early 1990s, after which the prices stabilised at their 1995 level for a sustained period. Feed prices, on the other hand, had been quite stable before their decline in 1995 (Figure 3). During EU membership, input prices have been quite stable, with the exception of energy prices. The Production Input Price Index rose by around 9% in the period 1995-2002. Energy prices have fluctuatedannually, but in 2000 they rose by as much as 25%. Since then they have fallen by 7% over the last couple of years. The prices of machinery and equipment and construction rose steadily between 1995 and 2000 by more than the average input price trend, and in 1995-2002 their prices increased by 15%.

Figure 4 presents the total indices for agriculture mentioned above and the Consumer Price Index, plus its subindices describing the price development of foodstuffs. During the first two years of EU membership, prices of foodstuffs fell by 9%. In the total index of consumer prices the fall in foodstuff prices was not apparent; the total index rose in the period 1995-1999 quite steadily at an annual rate of 1.2%. In 2000 consumer prices, like agricultural input prices, began to rise significantly. In 2000-2002 they rose at an annual rate of around 2.5%. Correspondingly, the change in agricultural producer prices was only 0.3% per year.

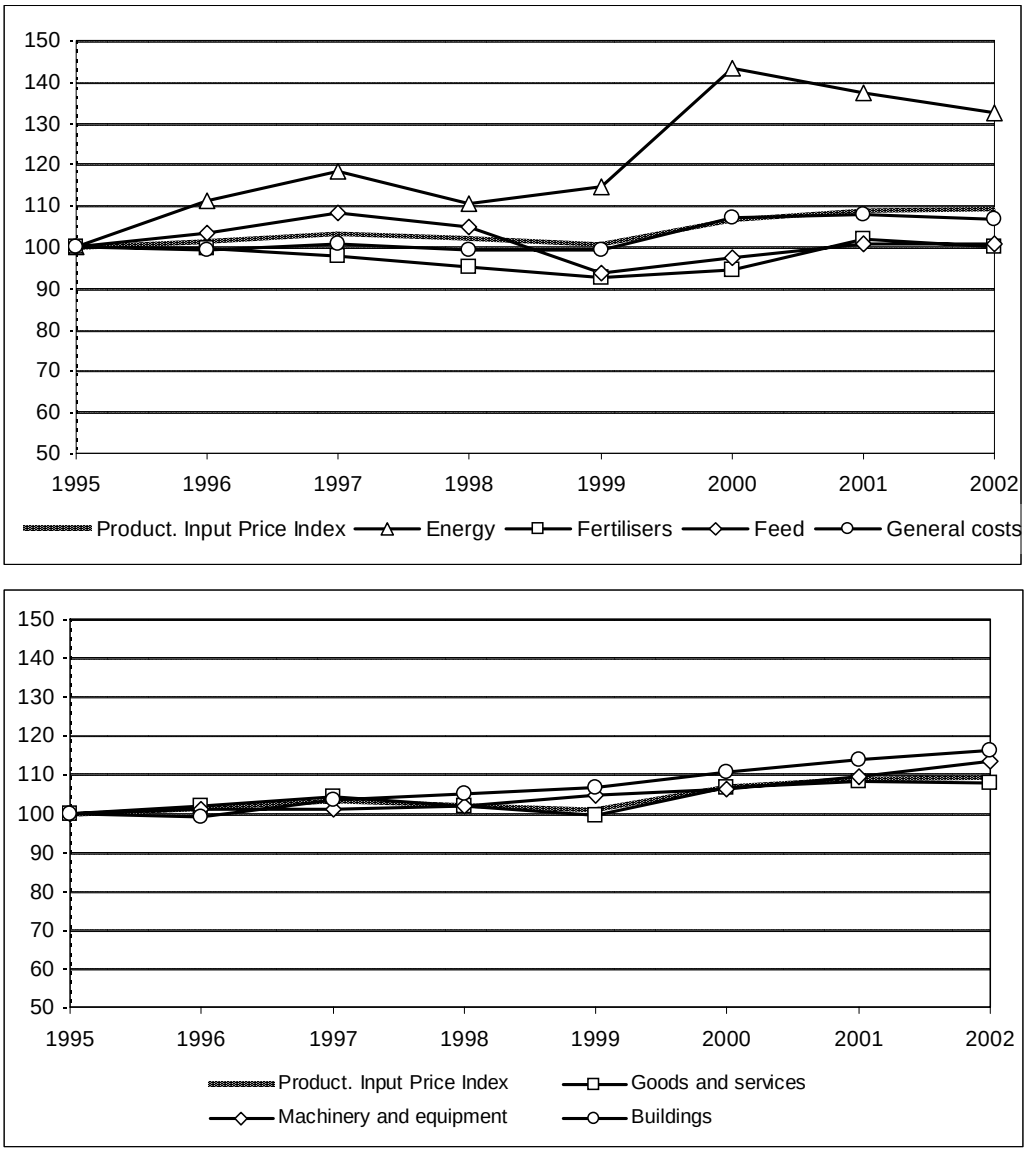

Figure 3. Agricultural Input Price Index in 1995-2002 (1995= 100). (Statistics Finland).

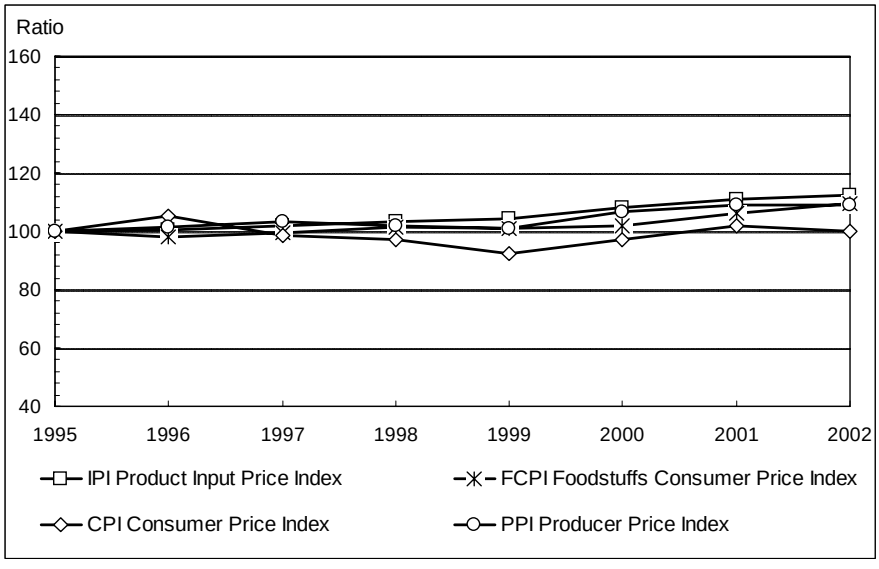

Figure 4. The nominal development of the Agricultural Producer Price Index (PPI) and Inputs Price Index (IPI) as well as the Consumer Price Index (CPI) and the Foodstuffs Consumer Price Index (FCPI) in 1995-2002e (1995=100). (Statistics Finland).

2.2.3.2 Agricultural input prices compared with EU countries' input prices

There follows a comparison of changes in Finnish agricultural input prices with the input price development of other EU countries. Figure 5a presents, based on Eurostat price monitoring, the price changes of agricultural inputs in Finland and certain Member States as well as the EU15 on average in the period 1995-2001. In this comparison of different EU countries' input prices, one must also take into account that the Eurostat index deals with the real price development of a wider sector than basic agriculture. The development of Finnish agricultural input prices has followed the development of the comparison countries, even though Finnish prices have not fallen quite so much as the EU15 average, nor have they risen as much as in Sweden, for example. Finland's small market and remote location may contribute to the fact that in Finland price development has been more stable than in the comparison countries.

Examined by commodity type (Figure 5b) in the period 1995-2000, fertiliser prices have fallen in Finland and in Denmark relatively more than in other EU countries. In 2001 fertiliser prices began to rise in all the countries examined, but in Finland substantially less than in Denmark, for example. The prices of seeds have fallen in Finland more than in the comparison countries. Prices of purchased concentrated feed for beef cattle have fallen as much as in the comparison countries, but the fall in prices came to an end with the poor season that affected the country's cereal production in 1999. Prices of purchased concentrated feed for pigs rose in 1996-97 relatively more than in the comparison countries and the subsequent fall in prices came to an end with the poor season that affected cereal production in 1999.

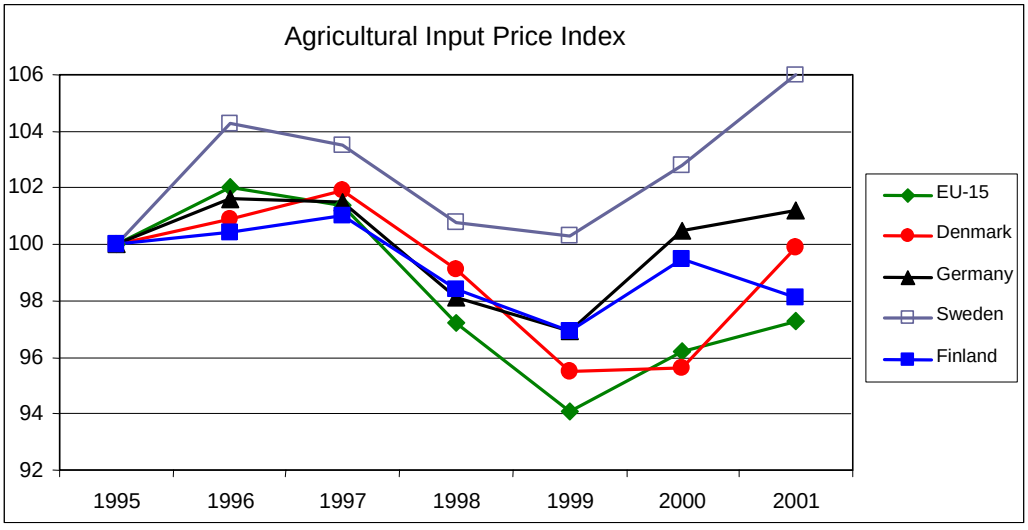

Figure 5a. Changes in real prices of agricultural inputs in Finland and in comparison countries in the period 1995-2001 (1995=100). (Eurostat).

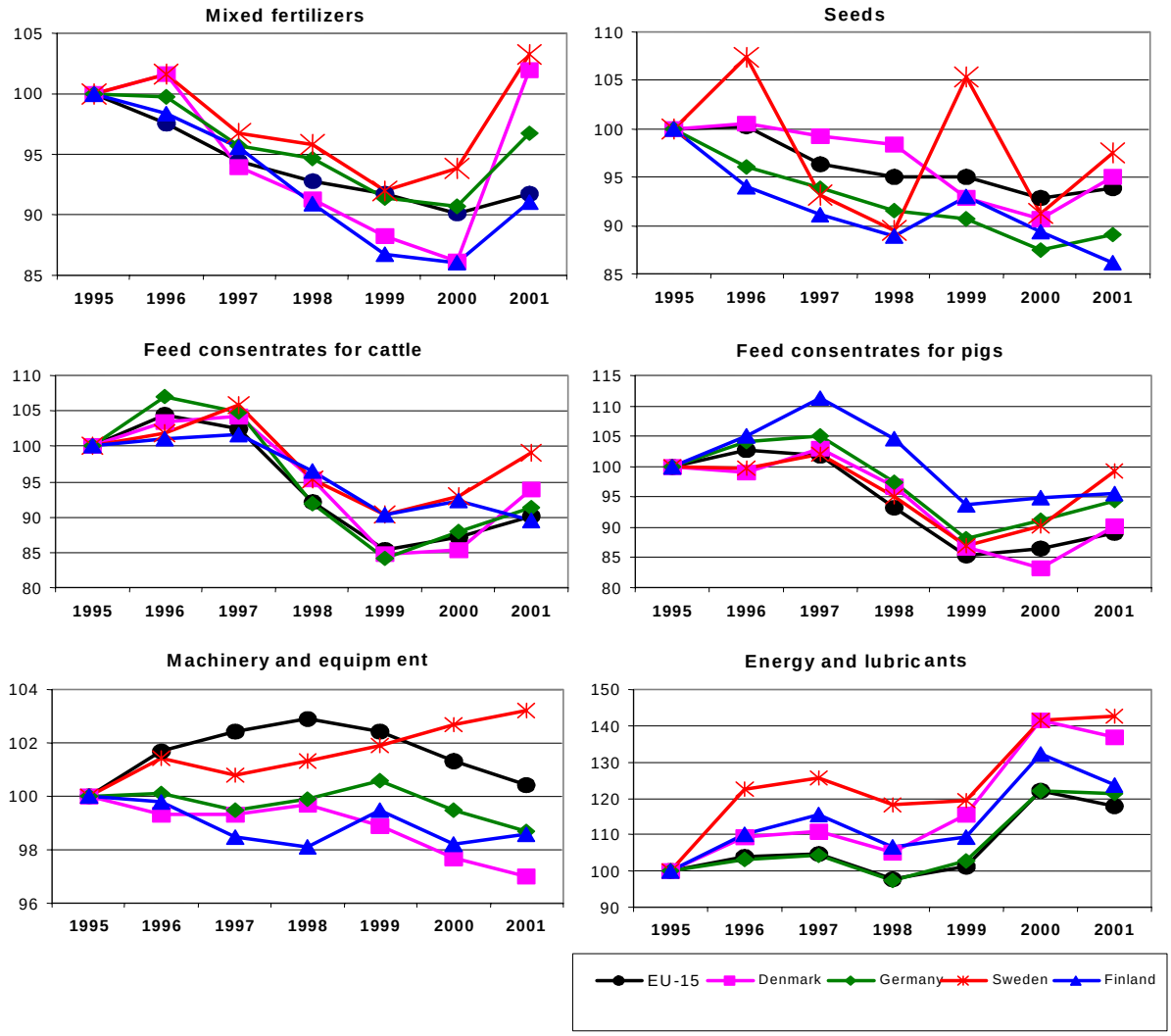

Figure 5b. Development of real prices of agricultural inputs by commodity group in Finland and in comparison countries in the period 1995-2001 (1995=100). (Eurostat).

It appears that, in Finland's small feed market, individual years of crop failure can have the effect of raising prices, which imports from elsewhere in the internal market cannot counteract. Prices of purchased feed in 2001 rose in the other comparison countries, but in Finland the prices of cattle feed in particular fell. Price of machinery and equipment have fallen in Finland to the same extent as in Denmark, while Finnish price changes in electricity, oil, fuel and lubricants are positioned between the price changes in Denmark and Germany and the EU15 average.

2.3 The price development of foodstuffs in Finland and in comparison countries

EU membership brought major changes to Finland's stable foodstuffs market through, among other things, increased imports of foodstuffs. After membership, food prices fell less than anticipated, by an average of 9%, while no great changes occurred in the structure of consumption itself (Statistics Finland). A comparison of the development of the consumer price levels of foodstuffs in eight different EU countries from 1996 to July 2002 shows that no great changes have taken place in the relationships between the countries' consumer price levels. Finland's price level was lower than Sweden's and Denmark's, but higher than the other comparison countries' price levels both in 1996 and in 2002 (Figure 6).

The prices of foodstuffs during EU membership have risen in Finland more moderately than other prices. The price of food has increased by 9.4% since 1995. The Consumer Price Index overall has risen over the same period by 12.5%. In the period 1996-2000 the rise in the consumer prices of foodstuffs was exceptionally moderate in the EU area. While the Consumer Price Index overall increased by 6.4%, the increase for foodstuffs alone was 3.5%. In 2001-2002 food rose in price more quickly than before, both in Finland and elsewhere in the EU internal market. In 2001 the EU area's Consumer Price Index overall rose by 2.4%, while the Consumer Price Index for Foodstuffs rose by 4.9%. In Finland the corresponding rise in consumer prices overall was 2.6% and in foodstuffs 4.3%.(Finnish Agriculture 2003).

In 2001 consumer prices of foodstuffs increased in Finland, mainly due to a rise in food industry production costs. Average consumer prices of dairy products rose by around 6% and

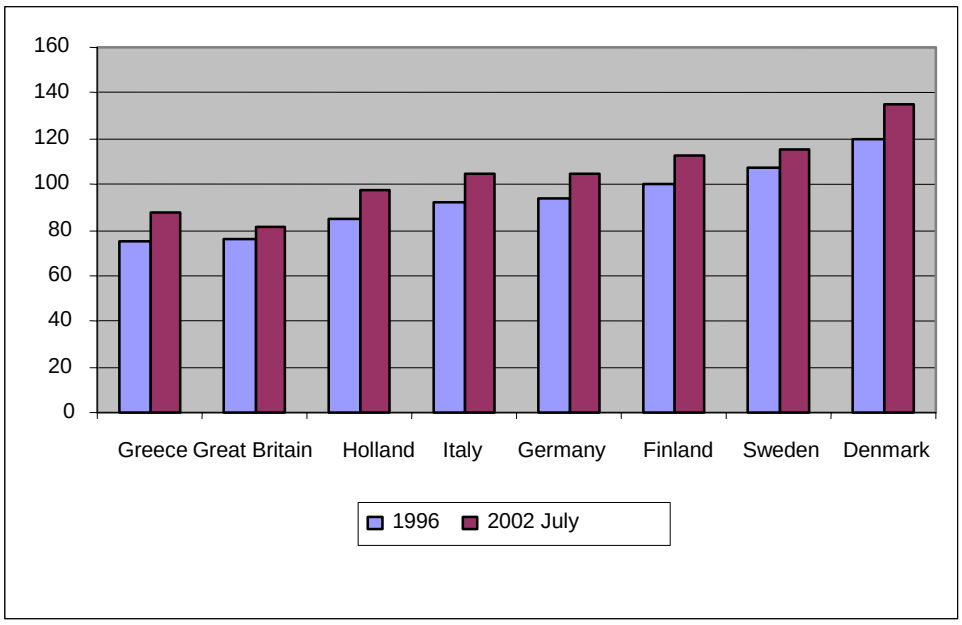

Figure 6. The consumer price level of foodstuffs in certain EU-countries in 1996 and in July 2002. (Purchasing power parity, ratios, 1996 Finland = 100). (Finnish Agriculture 2003, Statistics Finland).

consumer prices of meat products by 9%. The rise in consumer prices of dairy products is explained by a settling down of market share competition between dairies and a subsequent raising of wholesale prices. In the meat industry, an increase in precautionary measures due to animal diseases led to additional costs, which were then reflected in consumer prices. Moreover, in 2002 the rise in food prices was faster than the rise in consumer prices in general. At that time the major reason for the rise in food prices was a rise in the price of imported fruit and vegetables as the result of a poor crop. (Finnish Agriculture 2003).

The adoption of the euro has facilitated comparison of consumer prices between euro countries. In addition to raw material prices, processing and trading margins, however, price differences are affected by large differences in indirect taxes in different euro countries and in different products. When examining consumer prices in different countries, one has to take into account the levels of value-added tax and excise duties as well as other taxes and charges that affect consumer prices in different countries. For example, Finland's 17% rate of value-added tax on food is around 10 percentage units higher than the average of euro countries, in other words it leads to comparison prices for Finland which are nearly 10% higher. (Finnish Agriculture 2002).

3 Agriculture in the AB support area

3.1 Production conditions in the AB support area compared to other EU Member States

3.1.1 Length of the growing season and the temperature sum

The effects of Finland's northern location on conditions for agricultural production become apparent on examining the length of the growing season and the effective temperature sum conditions, and on comparing these with corresponding indicators for the main agricultural areas of the EU's other Member States. The thermal growing season, i.e. the period when the average daily temperature is above +5 ^{o}C, begins in Finland in late April/early May and ends in October, lasting at most 180 days on the mainland. In different parts of the country, the growing season varies from nearly six months in Southern Finland to 2-3 months in northernmost Finland. In Southern Finland, in an area that approximates to the AB support area, the growing season is, according to long-term statistics, more than 170 days and in the Åland Islands 180-190 days.

In Finland the growing season is on average 20-25 days shorter than in Southern Sweden and 29-44 days shorter than in Denmark. In Sweden the 180-day growing season curve runs from the heights of Gävle through the north part of the Great Lakes region to Norway in the vicinity of Oslo. Only around 17% (462,500 ha) of Sweden's total arable area is situated to the north of this line. Elsewhere in Europe the growing season is longer than in Finland (Figure 7). The short growing season effects yield levels and the choice of plant species and varieties

in Finland. For example, it is not possible to grow in Finland the nutrient-rich and high-yielding maize silage, which is popular in Denmark and Germany.

In addition to the length of the growing season, crop production is affected by the temperature of the growing season. By the effective temperature sum is meant the sum of the average daily temperatures during the growing season. In Southern Finland the effective temperature sum is more than 1,200 ºC and covers an area slightly larger than that delineated by the 170-day growing season curve. In Sweden the 1,200 °C effective temperature sum curve follows the 180-day growing season curve. Elsewhere in Europe, sum curves which are below 1,200 °C are found only in the northern parts and mountains of Scotland, where the growing season, however, is longer than in Finland. (Figure 8).

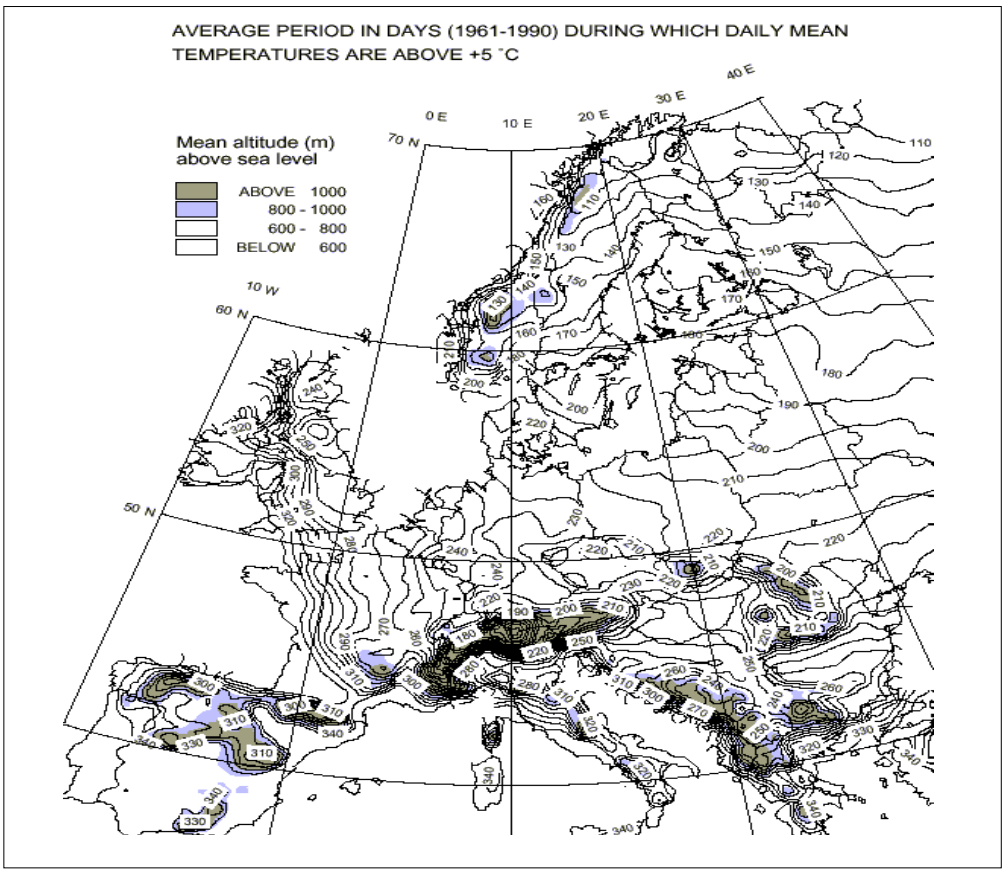

Figure 7. Length of growing season in different areas of the European Union. (Finnish Meteorological Institute, MTT).

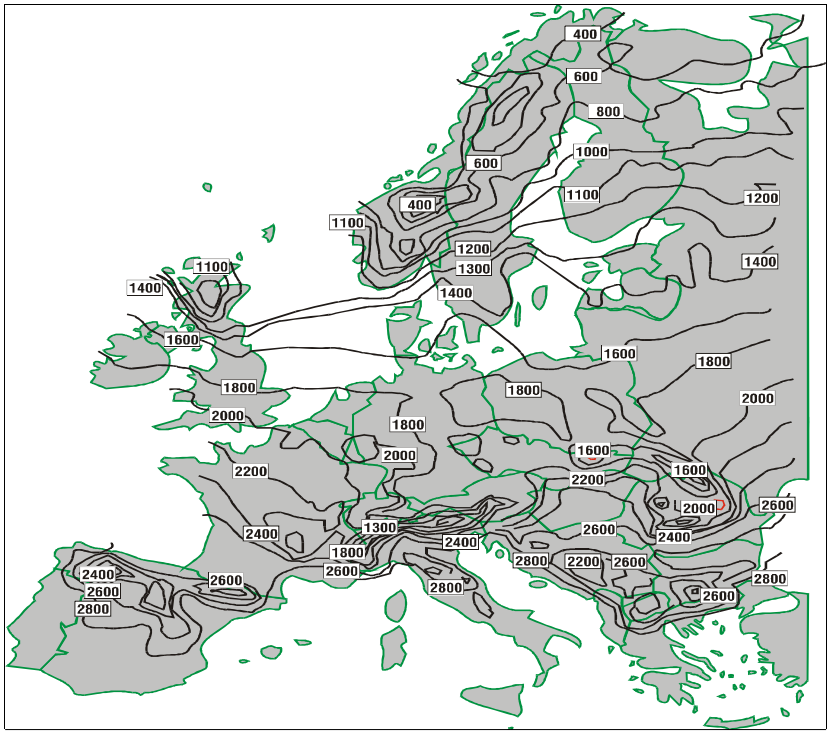

Figure 8. Effective temperature sums of growing season in the European Union area. (Finnish Meteorological Institute, MTT).

3.1.2 Hectare yields

Hectare yields in Finland reflect the strong annual variations in production conditions. In recent decades in Finland there has been at least one year of crop failure in each decade. The yields of cereals and hay were significantly below the long-term average in 1992, production conditions were too wet in 1998 and, especially in the southern parts of the country, too dry in 1999. The poor years in terms of production conditions lower the size of the yield and the quality the crop. Quality losses result in grain grown, for example, as bread or malt grain ending up as feed grain. The deterioration in the quality of feed lowers livestock production and increases unit costs. In the mid-1990s there were better years, and the years 2000-2002 have also been closer to the long-term average, particularly with regard to grains.

In 1995 the AB support area produced 96% of the bread grain and 50% of the feed grain, and in 2002 slightly lower shares, namely 92% of bread grain and 45% of feed grain. Around 7% of the arable land of the AB support area is under wheat, because in Finland wheat can be cultivated only in the best production areas. In Southern Finland the hectare yields for wheat have varied in the period 1995-2002 between around 3.3 tonnes and 4.0 tonnes, whereas in the dry year of 1999 the yield was only 2.3 tonnes per hectare. Rye yields have fluctuated between 2.3 and 3.0 tonnes per hectare, but in the wet year of 1998 the rye yield was only 1.8 tonnes per hectare. Of the feed grains, barley yield levels have in recent years been higher than the yield levels for oats. The feed grain yields normally fluctuate in the AB support area between 3.0 and 3.7 tonnes per hectare, but in the years of crop failure the yields were even below 2.5 tonnes per hectare (Figure 9).

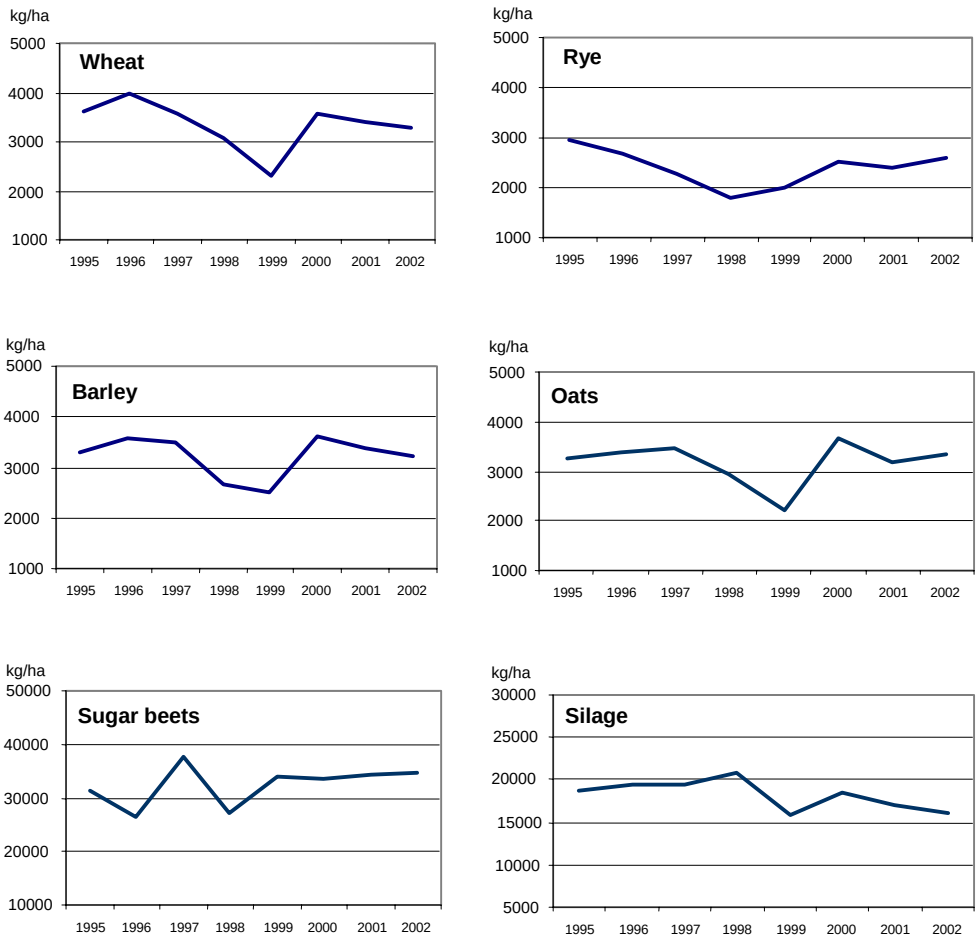

Figure 9. The hectare yields (kg/ha) of the most important agricultural crops in the AB support area in the period 1995-2002. (Tike).

Figures 10a and b compare the hectare yields of wheat and barley in Finland in the AB support area and in the other Member States as well as in the EU15 on average. In the period 1995-2001 the wheat yield has been 31-69% and the barley yield 10-58% lower than in the comparison countries. Fluctuations resulting from weather conditions are also greater in Finland than in the comparison countries. In the crop failure years of 1998-99 the wheat and barley yields in Southern Finland were around a quarter lower than in the five other years of the period examined.

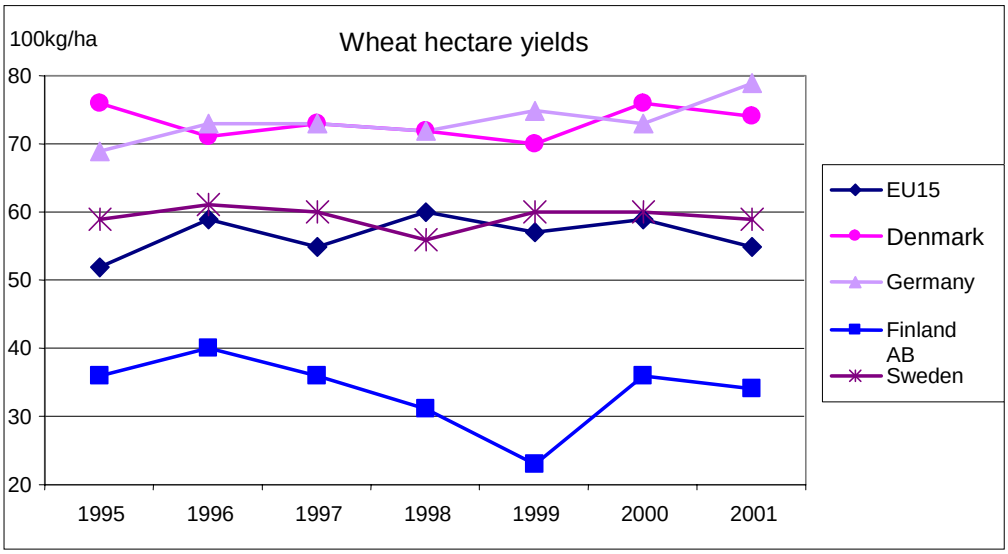

Figure 10 a. Wheat hectare yields (100 kg/ha) in the AB support area compared with average yields for Sweden, Denmark, Germany and EU15 in the period 1995-2001. (Tike, Eurostat).

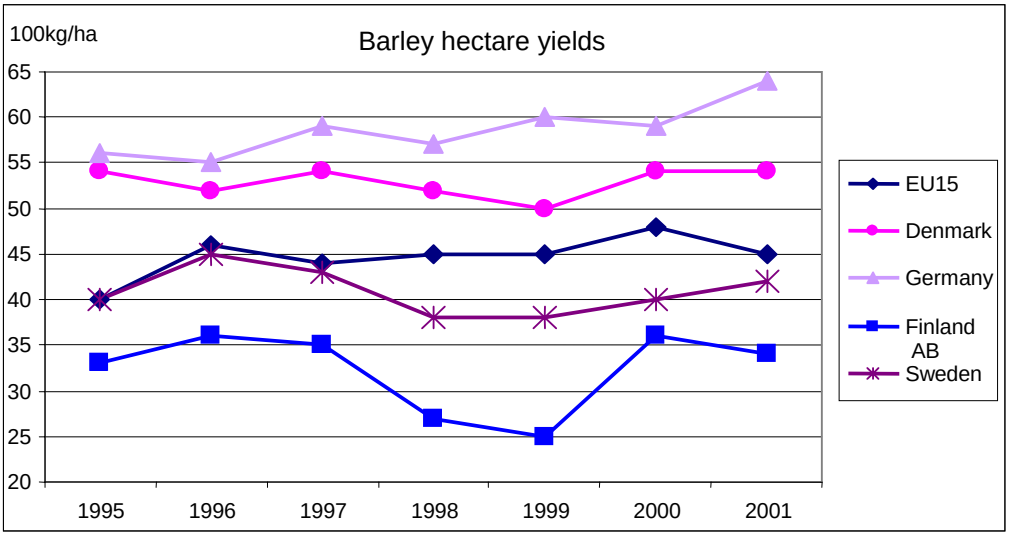

Figure 10 b. Barley hectare yields (100 kg/ha) in the AB support area compared with average yields for Sweden, Denmark, Germany and EU15 in the period 1995-2001. (Tike, Eurostat).

Yields show annual fluctuations in horticultural production, too. Figure 11 presents the average yield levels of the most common open-field horticultural crops in Finland. Of the cultivated area for these crops, 76% is in the AB area and yield levels in normal years do not differ substantially from the yields in the second largest production area, i.e. the western C1 support area. In the period 1995-2002, hectare yields for open-field horticultural crops have fluctuated most in respect of swede, while the hectare yield for beetroot has risen annually.

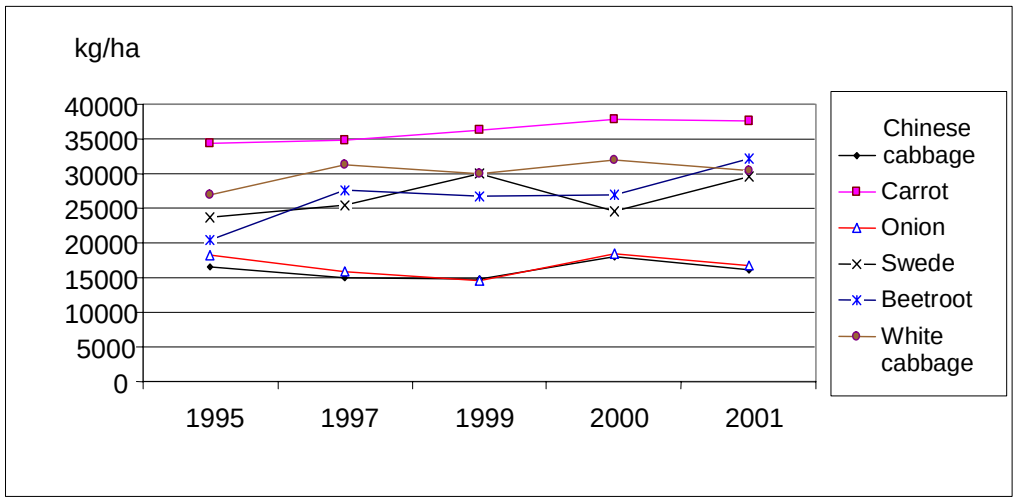

Figure 11. Average hectare yields (kg/ha) of the main horticultural crops in Finland in the period 1995-2001. (Tike).

3.1.3 Adverse factors in agriculture resulting from natural conditions

Natural conditions and an agricultural structure dominated by small farms result in higher production costs than competitor countries and therefore constitute a competitive disadvantage. The structure of agriculture can be developed through investments, and technological development helps in overcoming natural conditions over the longer term by lowering production costs arising from transport distances, the long winter and the short growing season. Developing the structure of agriculture and technology takes time, however, and progress on these fronts also depends to a great extent on the profitability outlook for the sector. Because the disadvantage resulting from natural conditions cannot be removed, it causes additional costs even in high technology production compared with competitor countries, while at the same the low yield level lowers the farmer's financial result on the output side.

Here follows an account of the main natural adverse factors in agriculture that create differences for the agricultural production of Southern Finland in comparison with other EU Member States. The account is based on memoranda of expert panels on different production sectors arranged by MMT Economic Research in autumn 2002. The special characteristics of Finland arising from natural conditions are reflected in the structural development of agriculture as well as in the financial performance of agriculture in terms of both returns and costs.

3.1.3.1 Winter-proof building and equipment solutions

In Finland buildings, equipment, machinery and animal transportation vehicles must be adapted to large temperature fluctuations, because in winter it is common in the northern parts of the country for the temperature to fall to minus 35 °C and even in the southern areas to minus 25 °C, while in the summer the temperature can rise to plus 25 °C throughout entire country. Finland's severe weather means that, compared with Central Europe, additional

costs arise from heating and insulating buildings, the need for a greater foundation depth and stronger foundations because of frost, and the need to arrange ventilation. The thermal insulation of livestock buildings has been estimated on the basis of Ministry of Agriculture and Forestry guideline costs at around 50 euros per square metre of floor area in 2001 (MMM construction guidelines). In a comparison of the costs of a typical shell-structure Central European production building and a thermally insulated Finnish production building, the cost difference resulting from thermal insulation is around 20 euros per square metre. Climate influences structural solutions not only due to thermal insulation of buildings but also due to a higher load-bearing requirement for snow. Winter property management with its snow ploughing and sanding as well as the need to maintain frozen roads in the spring also increase costs for agriculture.

Preventing the condensation of moisture in livestock buildings places demands not only on ventilation but also on building materials. The northern climate sets its own demands on storage buildings (frost insulation, roofing). In Finland it is necessary to store relatively large amounts of fodder for the long indoor feeding season, which means that storage buildings have to be large (silos etc.).

The old cowsheds are almost entirely warm stall-type structures. The new livestock barns are, as a rule, warm open-type structures, because problems with cold open-type cowsheds include greater labour (manure removal, drying) and poorer working conditions for the handler. In a thermally insulated cowshed the animals for the most part generate the heat themselves and only auxiliary premises need a separate heating system. In a cold open-type cowshed around one third of the space still has to be thermally insulated (milking station, service facilities, calf and veterinary unit). Animals calved on suckler cow farms also need a warm shed in freezing weather. In cold open-type cowsheds the mechanisation of feed distribution, the warming of water containers and the cleaning of animals have often been found to be problematic. Volumetrically large, warm open-type cowsheds also need additional heating to a certain extent in winter.

Grazing and winter exercise is good for the health of animals, especially those kept in stall-type cowsheds. The winter makes the establishment of exercise yards problematic and that’s why they have not became as widespread as had been hoped. The establishment of a frost-insulated winter exercise yard is an expensive investment. Keeping exercise yards clean in winter is problematic and the snow and rainwater that accumulates in them require either an absorption system or storage space.

In Finland manure stores have to be of a size sufficient to store 12 months’ manure production, whereas elsewhere in Europe 6-8 months is a sufficient storage time. In small units, manure stores mean that setting up costs are relatively higher. Similarly the long winter means that manure stores have to be large, because the spreading of manure on frozen ground is forbidden in the terms of agri-environmental support relating to the so-called nitrate directive. In Central Europe there is more time for manure spreading and the need for

storage is therefore less. In Finland manure spreading takes place mainly in the busy spring time, when the wet soil is suitably disposed to compaction.

The cold restricts automation of working tasks because, due to ice and condensation water, technology doesn't work as well in cold as in warm conditions. On cattle farms the freezing of fodder reaped when wet creates the need in Finland for a heatable intermediate store, because cold silage is not suitable as feed for ruminants. Through the predrying of mown silage in the field, an attempt is made to increase the dry matter content of the silage to more than 30%, but due to fluctuations in weather conditions nearly every year the silage reaped is wetter than this. In addition, predried silage requires more expensive technology.

Flat silos are the most common storage method for silage in Finland. Using silage towers it would be possible to mechanise completely the feeding of roughage, but this requires the purchase of an expensive and integrated chain of machines. In recent years, round baling technology that uses plastic has spread through Finland quite rapidly, because it facilitates the relatively efficient harvesting of hay with a scattered field structure and on small farms. Round bales can be stored at the edge of the field over winter. Round bale technology consumes expensive plastic and it is not suitable for the harvesting of whole grain silage. On the other hand, it is very suitable for contract work and can also serve if necessary as a one-man harvesting chain.

Pig and poultry farms in Finland must be thermally insulated and equipped with an additional heating system. In future, the shift in egg production to more spacious production solutions will create additional costs per hen and kilo of eggs. Variable costs for the heating of production buildings alone are currently around 1.5 cents per kilo of eggs in cage henhouses and heating costs in floor henhouses are double (Pärkö 2002). In the production of poultrymeat, energy costs in Finland are increased in comparison with other EU countries by the lowest animal density requirement after Sweden. It is expected that future animal welfare statutes will not reduce this cost difference. In terms of thermal insulation and other characteristics, there is no difference in production buildings in different parts of the country. Maintaining the nationally good record for hygiene and disease incidence also results in costs relating to structures and keeping them clean.

Finnish horticultural production is also uncompetitive in the EU internal market because of high production costs resulting from natural conditions. In greenhouse production a significant natural disadvantage is the short growing season and the low amount of radiation. Some 85% of Finland's greenhouse production is traditional, unilluminated seasonal cultivation. This means that yield levels are significantly lower than in Europe, for example the tomato yield in Finland is around 60-70% of the tomato yield in the Netherlands. Due to the low yields, unit costs are high. The cold climate arising from Finland's northern location increases the need for heating by around 50% compared with Central Europe. Covering the difference in natural light conditions of Finland and Central Europe with artificial light also gener-

ates additional costs. Finland's southernmost production areas are located further north than, for example, Sweden's main production area. The cold winter and frost impose special demands on the basic structures of greenhouses. Taking the weight of snow load into account in greenhouse structures cannot generally be done and in practice growers must remove the snow from the roofs of greenhouse when necessary.

Moreover, the biggest competitive disadvantage in vegetable production outdoors is the short growing season and the low yields. So that consumers can be offered vegetables right through the winter, the storage season is long. This sets high demands on the technical standard of the storage places and they have to be equipped with refrigeration and heating systems. The long storage season increases losses, which result in significant additional costs. Elsewhere in Europe vegetables are stored to a large extent over winter on the land.

3.1.3.2 The seasonal nature of farming work

Due to the low yield levels, all arable farming work is focused on a relatively larger area than in countries that have higher yield levels. On the other hand, the short growing season means that the scheduling of work is important and there is substantially less time for performing the work than in countries with a longer growing season. As a result of the seasonal nature of arable farming, mechanisation must be efficient and therefore machinery costs per hectare are higher than in the countries of Central Europe. Cooperation between farmers and contracting is adversely affected by the simultaneous need for machinery and by the long distances between farms.

In Finland the peaks of working activity in the growing season are short. Machinery and equipment capacity has to be higher and more efficient in Finland than in Central Europe due to the short, seasonal nature of working time. The peaks of working activity cannot be evened out in Finland through crop selection as is possible in Central Europe. The spreading of manure has to be carried out on thawed soil, so this also often has to be performed at the busiest time. In Finland, an increase in unit size does not achieve scale advantages in arable farming similar to those achievable in Central Europe, because in Finland arable farmers have to operate in a relatively larger area, with a weaker land structure and a shorter growing season. In Finland the quality of silage grass deteriorates quickly and it has to be harvested several times in a summer, while in Central Europe the maize silage which is widely grown is cut once a summer and it can be harvested over a longer period without weakening the quality of the feed. This means that it is necessary to have an efficient feed harvesting chain in Finland.

Table 4 presents the times available for different agricultural tasks, calculated on the basis of long-term weather statistics (Laine 1996). From the table one can see that only a few days are available for work of a seasonal nature. Although attempts are also made in Finland to extend the grain harvesting season through species and variety selection, the uncertain weather

means that there are not many suitable threshing days available in the autumn (Figure 12). This requires the harvesting equipment to have a large capacity compared with farms of corresponding size in the more southerly Member States, where there are significantly more suitable threshing days.

The brief crop harvesting periods have adversely affected the spread of contracting in Finland. The efficient and heavy machines compact the fields and reduce their crop production capacity. The heavy machines dictate that manure spreading in Finland takes place mainly in the busy spring time, when the wet soil is too prone to compaction. The clay soils common in Southern Finland are particularly problematic. They compact easily and they are adversely affected more easily by both dry and wet conditions.

Table 4. The average starting times for various arable farming tasks, the lengths of the working periods and the actual possible working days according to weather statistics in Southern Finland. (Laine 1996).

Work	Average starting day	Length of the working period, days	Available time, days
Cultivation and sowing work	5 May	20	9
Harvesting of silage 1st crop	8 June	12	6
Harvesting of silage 2nd crop	27 July	18	7
Hay harvesting	27 June	21	4
Grain harvesting	10 August	45	20

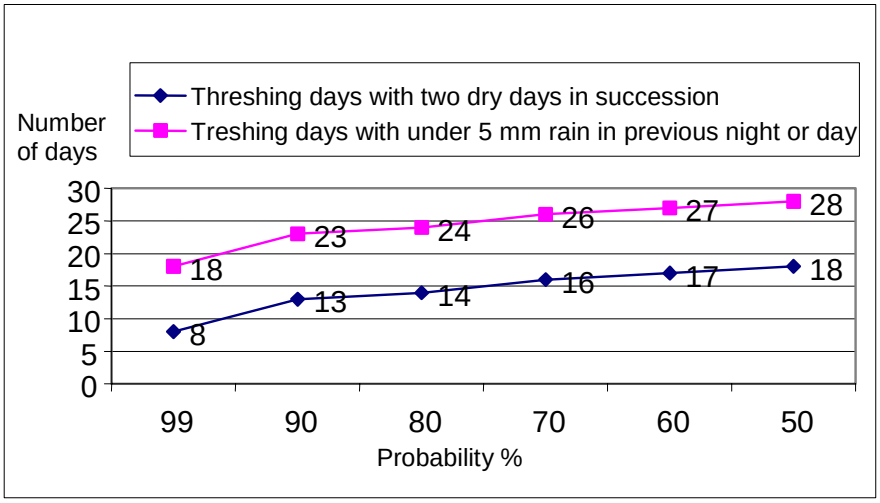

Figure 12. Number of threshing days based on probabilities calculated from long-term weather statistics. The figure assumes that the length of the whole harvesting season is 45 days (Laine 1996).

Differences in the length and timing of growing seasons are also emphasised in the production of early vegetables, berries and potatoes. While in Central Europe the early crop is harvested and marketed in spring, in Finland the products of the previous cropping season are still in store. Finland's early crop, furthermore, has to compete with the main crop in Central Europe, which is ready at the same time. In Finland the earliest crop is ready in the Åland Islands, but the Åland Islands constitute a relatively small area. Around 1.3% of the AB support area and 0.7% of the entire arable area of the country is situated in the Åland Islands, so its production is not a sufficient solution to the competition faced by Finland's early production market.

3.1.3.3 The feeding of livestock

Cattle husbandry

In cattle husbandry the aid policy that lowers the market price of grain is resulting in a number of problems in terms of the biology of the cattle. The increased use in the cattle's diet of concentrated feed, which is cheaper than roughage, causes problems for the animal's health due to too high concentrations. A dairy cow's need for roughage varies greatly, due to the quality of roughage. With good grass silage, 40% concentrated feed in the diet can start to cause health problems, but by feeding beef cattle with straw it is possible to raise the proportion of concentrated feed in the diet to 80%. High amounts of concentrated feed increase the amount of phosphorous in manure, which in turn increases the phosphorous load in the waterways.

Cheap grain is not a sustainable solution; in northern conditions milk and beef production must in future be based on grass. Although in Finland the market price for grain is relatively the same as in other EU countries, cattle production's competitiveness, like other types of animal husbandry, is adversely affected in Finland relative to the other EU Member States by, for example

1) high roughage production costs,
2) small field parcels,
3) low yield level,
4) for the low yield level the production of a unit of feed is spread over a relatively greater area and causes additional field work,
5) the short grazing season,
6) the short working seasons,
7) the high storage capacity need.

The high production cost of roughage is one of the main factors that adversely impact the competitiveness of milk production. In Finland, according to FADN bookkeeping, more than 50% of the arable land of dairy farms in the AB support area is used for grass feed and the rest for feed grain. To ensure the quality of feed grain, it is generally dried either in warm-air or cold-air dryers. Undried crushed silage grain is used by only around one fifth of beef

farms. Of the cultivated grass area, around 20% is used for grazing and the rest for growing silage. Both silage and grazing areas have to be renewed in Finland at three to four year intervals due to winter damage etc. Compared with dairy farms in the AB support area, on dairy farms of similar size in Germany and Denmark the proportion of grass feed, taking into account permanent pasture land and natural meadows, is only around 30%, the proportion of maize and other annual feed crops 15% and grains 50-55% of field area. In Finland the cultivated roughage area needed per dairy cow is more than a hectare, whereas in Denmark the figure is 0.5 ha (with the permanent grazing area 0,7 ha) and in Germany 0.3 ha (0,8 ha) (Figure 13, Table 5).

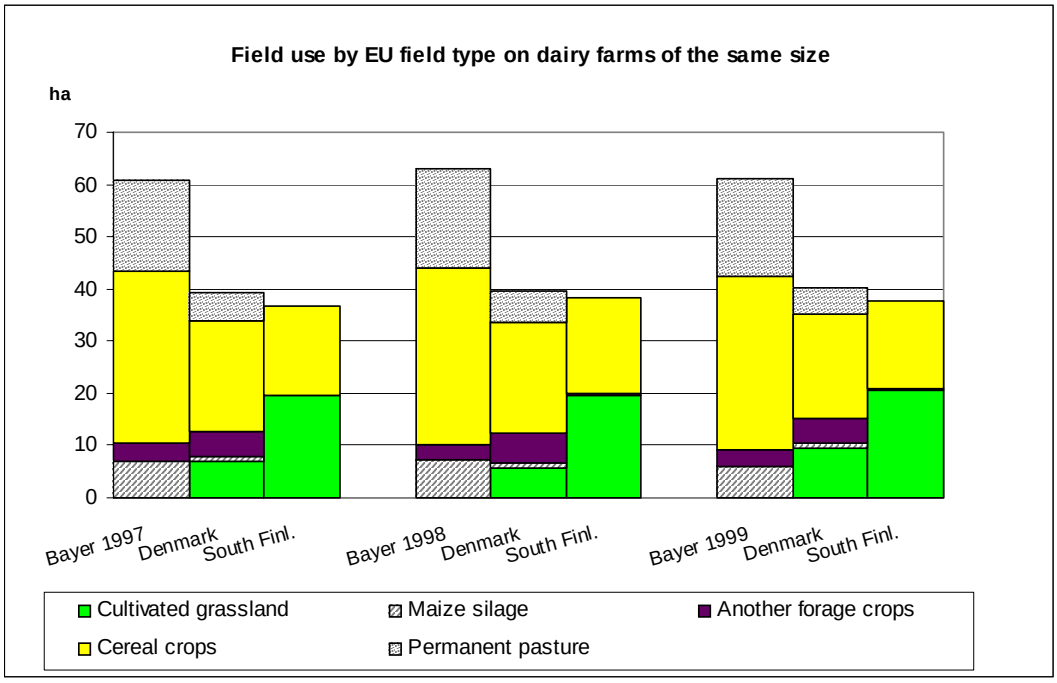

Figure 13. Field use by EU field type on dairy farms of the same size in Finland and in comparison countries in the period 1997-1999. (MTT Economic Research, FADN-EC-DG AGRI/A.3 1999).

Table 5. Roughage production area on dairy farms of the same size (by European Size Units) in Finland and in comparison countries. (MTT Economic Research, FADN-EC-DG AGRI/A.3 1999).

Feed production area	Finland			Germany			Denmark		
	1997	1998	1999	1997	1998	1999	1997	1998	1999
Number of cows/farm	19	19	19	36	35	35	28	28	28
Cultivated feed grass, ha /farm	19.7	19.6	20.6	0.0	0.1	0.0	7.0	5.7	9.4
Feed root plants, feed cabbage, ha/farm	0.0	0.0	0.0	0.1	0.0	0.0	2.1	2.2	1.5
Feed maize, ha /farm	0.0	0.0	0.0	7.0	7.2	6.1	0.8	1.1	0.9
Other grain silage, ha/farm	0.0	0.2	0.1	0.1	0.0	0.0	2.6	3.4	3.3
Other feed plants (legumes etc), ha/farm	0.0	0.2	0.4	3.4	2.8	3.0	0.0	0.0	0.0
Cultivated field area total, ha/farm	19.7	20.0	21.0	10.5	10.1	9.2	12.6	12.3	15.1
Permanent grazing areas, meadows, ha/farm	0.0	0.0	0.0	17.5	18.9	18.4	5.4	5.9	5.1
Cultivated field area, ha/cow	1.0	1.0	1.1	0.3	0.3	0.3	0.5	0.4	0.5

The production cost of a silage unit in the AB support area in the period 1995-2002e has been around 25-32 cents, whereas the price of a pasture feed unit has been 13-18 cents. Taking into account per hectare supports, the production cost of silage is 15-22 cents and of pasture 3-8 cents. Thus the production cost of a pasture feed unit in Finland is 40-52% lower than the production cost of a silage unit and 65-82% lower when supports are taken into account. (Pro Agria MKL, Hila calculations).

Utilising pasture feed, which is cheaper than silage, is restricted by Finland's short growing season. The length of the grazing season is only around 110 days. The disadvantage resulting from the short grazing season can be assessed by examining the proportion of feeding accounted for by grazing. The grazing season of less than four months means that grazing covers only 14% of a cow's annual food requirement in Finland. Correspondingly, in Ireland and the UK, for example, the proportion of grazing is around 60% of annual food intake. In Denmark the proportion of grazing is 32% and in Germany 26% (Weissbach & Gordon 1992).

The entire crop of maize and other annual feed crops used in other EU countries can be harvested at one time. In Finland the hectare yield of grass is lower and the grass has to be harvested two or three times in a summer. Furthermore, due to the long hours of daylight in Finland in the summer, the first grass crop must be harvested quickly because it ages and the quality of feed deteriorates from the nutritional optimum within a week, depending of the weather. Maize does not need feed conserving chemicals and it is easier than grass to preserve. Due to Finland's long indoor feeding season, the animals need relatively more grass silage and hay (dry hay is used mainly as health feed) than in other EU countries. The cold climate in principle reduces storage losses but, owing to the great storage need for feed, storage losses always arise to some extent, however.

When maize silage or other annual crops are grown, the manure obtained is easily used and efficiently exploited. The spreading of manure on grass fields succeeds best at the establishment stage, because the spreading of manure on grass is slow and the manure being spread can result in quality problems for the harvested feed grass. Grass fields are renewed in Finnish conditions at three to four year intervals. According to a survey of livestock farms conducted in 2002, 64% of beef farms used pre-dried grass silage and 31% fresh grass silage. Only 5% of cattle farms used whole grain silage, mostly for feeding beef cattle. Whole grain silage is best suited for mixed grain and silage feeding, which is being increasingly adopted in the new, large cowsheds. In Central Europe maize silage, which can be considered roughly comparable to whole grain silage, is very common. The use of whole grain silage is also being increasingly adopted in Finland as the grain threshing and harvesting machine stock on cattle farms ages.

Pig and poultry farming

In pig and poultry farming, feeding in Finland is based on the use of dried barley and oats, whereas in Central Europe maize and wheat serve as the energy feed in the feeding of pigs. Crushed silage grain is simply not used in the feeding of pigs in Finland, because it requires a thermally insulated store, and automation of feeding is a problem. As pig feed, maize is more concentrated and less of it is needed than grain. Wheat contains around 10% and maize 15% more energy than barley. Pig farms, however, produce most of the grain they need themselves, so that they can spread manure on the prepared soil in the spring. Of course, the production costs of domestic grain are high due to low yield levels and high cultivation costs.

It can be assumed that the cost of producing grain on pig and poultry farms is at least as high as on cereal farms. The production cost of Southern Finland cereal farms included in FADN bookkeeping was on average 327 euros per tonne of grain in 2000. The data cover 125 cereal farms, whose arable area averaged 57 hectares. If the supports received are deducted, costs of 178 euros per tonne of grain still remain. Thus the cost of producing one's own grain is nearly three times the present market price of feed grain. The difference is still one and a half times if the supports received are deducted from the production costs.

The feeding of poultry is also based in Finland to a large extent on the farms' own cereal production, allowing the hen manure to be spread on the farms' own fields. The manure of 10,000 hens, for example, requires a field area of around 80 hectares to comply with the terms of agri-environmental support. The feed mix for hens contains around 75% grain. Research by Lehmusvuori (1999) shows that, on three quarters of farms, the proportion of feed accounted for by the farms' own grain was more than half. Generally oats and barley are used in the feeding of hens, and some farmers also use a little wheat. With Finnish egg producers, however, the crop yield for grain is rather weak compared with other EU countries, where the feeding of hens is based on wheat. In addition to wheat, maize or autumn barley are also used to some extent, so in competitor countries the per hectare unit yields for feed are more than double in comparison with Finland.

The amounts of domestic barley and oats produced are generally sufficient for the feed industry, although the quality of feed varies due to annual variations in the weather. An estimated 30-40% of pigmeat is produced completely with purchased feed concentrates, so the use of industrially manufactured feed is relatively low in Finland. When livestock is fed completely with feed concentrates the quality variations in feed are small. Many of the farms, however, feed pigs and poultry with home-produced feed, whereupon quality variations in feed are a greater problem. In Denmark sugarbeet pulp, among other things, is used to a significant extent in the feeding of pigs in the autumn. In Finland beef farms use sugarbeet pulp and sugarbeet is not grown to a similar extent.

Because maize, for example, cannot be used in the feeding of pigs, an attempt is made to compensate for this deficiency by adding to feed fats, but their price level is much higher than barley or oats. A wider range of raw materials for pig feed is used in Europe than in Finland, and e.g. leguminous plants, which are problematic in their winter stability, are widely used. Due to the small farm size, compromises have to be made in the feeding technology and diversity of animals, although in the feeding methods themselves there is no difference. In Denmark pig rearing in open-type sheds and the more abundant use of straw are favoured. In Finland the harvesting of straw is limited mainly by variable autumn weather conditions, the short working season and smaller straw production.

3.1.3.4 Long distances, small market

Logistics costs in Finland are high due to the small farm size and the widely dispersed distribution of farms. Logistics costs can be divided into logistics costs within and outside the farm. Internal logistics costs for farms are increased in Finland by the small size of farms and field parcels as well as by the low proportion of the land area accounted for by agricultural land. While in Finland a one hundred hectare area has only seven hectares of agricultural land, elsewhere in the EU countries the proportion of agricultural land is clearly higher, at around 50 hectares on average. Besides transports within the farm, external transports of animals and feed are longer in Finland, generating additional costs. Animal transport vehicles have to take into account Finland's large temperature differences, which increase the price of the vehicles relative to other EU countries. Raising the competitiveness of the food industry and centralisation has reduced the number of slaughterhouses, which has increased transport journeys and costs.

In addition to domestic raw materials, pig and poultry farming in particular have to use imported raw materials. In Finland, soya used as protein feed for pigs is a notable addition to costs. The need for imported protein has been increased by the prohibition on bone meal and fish meal, as a result of which the use of soya in pig feed has increased. Besides the long transport distances, the relatively low import volumes due to the small market also increase the prices of imported good. For example, the import of soya has been estimated to increase costs for the feed industry by around five cents per kilo of imported soya. Among the factors that cause additional costs are, for example, intermediate storage in Denmark, salmonella restrictions, shipping across the Baltic, import harbour services and quarantine controls, as well as forwarding to the factory that manufactures the feed.

The Finnish feed industry is committed to act in accordance with consumers' choices to ensure that no harmful diseases or other risk factors spread into the food chain via feed mixtures. Raw material consignments imported into Finland must be salmonella free and must not be gene modified. Consignment tracking and various quality control measures are required in order to achieve this. To ensure salmonella-free raw materials, raw material

consignments imported into Europe must be unloaded in Central Europe, processed and reloaded. Salmonella prevention also includes further, separate quarantine storage in Finland. For Finland's feed industry these measures are estimated to generate an additional cost of around 5.5 cents per kilo of feed raw material. The proportion of concentrate in pig and poultry feed mixtures in Finland is around 16 per cent, and an estimated 90-95% of the raw material for this is imported. Thus the additional cost arising from the concentrate is around 8 euros per tonne of feed.

In horticultural production, too, long distances have an adverse impact the competitiveness of the entire production chain. The price of import products also determines to a large extent the price level of domestic products. The dispersed distribution of open-field production enterprises is a limiting factor for the competitiveness of vegetable production. Production is based, however, mainly on family enterprises and each enterprise must for practical reasons have their own (or shared with a close neighbour) storage and packing facilities. On the other hand, there are also concentrations of vegetable production expertise in the areas of Varsinais-Suomi and Etelä-Savo. Effective marketing cooperation and shared packing plants do exist in these areas. Generally, horticultural products are produced for domestic use and are only occasionally exported. The domestic predominance is marked, particularly in vegetables and other edible products, with consumers buying Finnish produce in the knowledge that it is safe. As far as ornamental plants are concerned, consumers do not pay the same amount of attention to domestic origin.

3.2 Magnitude of agricultural and horticultural production, its development in the AB support area and its share of total national production

3.2.1 Production structure and its development in the AB support area

3.2.1.1 Livestock production

Livestock production in the AB support area is weighted more towards pigmeat, poultrymeat and eggs, while in the other parts of the country milk production has a greater significance. In the period 1995-2001, the amount of milk production declined in the AB support area by 12%. The amount of beef production grew in the period 1995-1997 by nearly 10% and declined thereafter. In 2001 beef production was 15% lower than in 1995. Pigmeat production in the area reached a peak in 1998, after which it has fallen slightly to below its 1995 level. Poultrymeat production grew by more than 70% during the period under review. Egg production declined by 14% and sheepmeat to less than half of its 1995 level (Table 6).

Table 6. Production volumes of the most important animal husbandry products in the AB area in the period 1995-2001. (Tike).

Product	1995	1996	1997	1998	1999	2000	2001
Dairy milk, mill. l	628.0	589.0	590.0	570.0	560.0	559.0	554.0
Beef, mill. kg	28.6	29.4	31.0	28.7	26.3	25.3	24.1
Pigmeat, mill. kg	104.2	107.1	111.5	114.0	110.5	103.0	102.5
Poultrymeat, mill. kg	28.0	34.5	34.3	41.2	44.7	41.1	48.1
Sheepmeat, mill. kg	0.7	0.7	0.6	0.6	0.4	0.3	0.3
Eggs, mill. kg	51.3	51.1	47.2	46.9	43.6	44.5	44.0

Livestock yields do not differ significantly in different parts of the country. Yields have grown most in milk production. The average yield per cow in the whole country has increased in the period 1995-2001 by around 16%, i.e. 2.8% per year. The pig farming's result of 19.5 weaned piglets per sow is from piglet production control farms, which are more efficient farms than all pig farms on average. In the egg production the yield level has remained constant (Table 7).

Table 7. Average yields of dairy cows, pigs and hens in the whole country in the period 1995-2002. (Tike).

Production	1995	1996	1997	1998	1999	2000	2001
Milk, kg/cow	6 308	6 314	6 447	6 561	6 796	7 143	7 303
Weaned piglets, per sow	19.5	19.5	19.4	19.5	19.4	19.3	19.5
Eggs, kg/hen	17.2	17.2	17.3	17.4	17.5	17.6	17.2

3.2.1.2 Crop production

In 2002 the AB support area had a total of 1,116,600 hectares of land under cultivation, of which around 10% was lying fallow. The area of land under cultivation includes land lying fallow, but it does not include meadows more than five years old, which are quite rare in Finland, the area of perennial horticultural plants nor the area of household gardens. In 1995 the area of arable land totalled 1,067,000 hectares. The amount of land under cultivation has increased in the period 1995-2002, due to arable land improvements etc., by 4.5%. The fallow area in 2002 was slightly greater, even though its share of the entire field area had not changed. The arable land of the AB support area constitutes around 54% of the total arable land area of the country.

Around 55% of the arable land of the AB area was in cereal production in 1995 and this had grown to 63% in 2002. The proportion of the area of oil crops produced on farms declined from 7% to 4%. The proportion of areas under potato and sugarbeet reduced slightly to stand at 3.5% in 2002. The proportion of grass feed area declined from 20% to 15% in the period

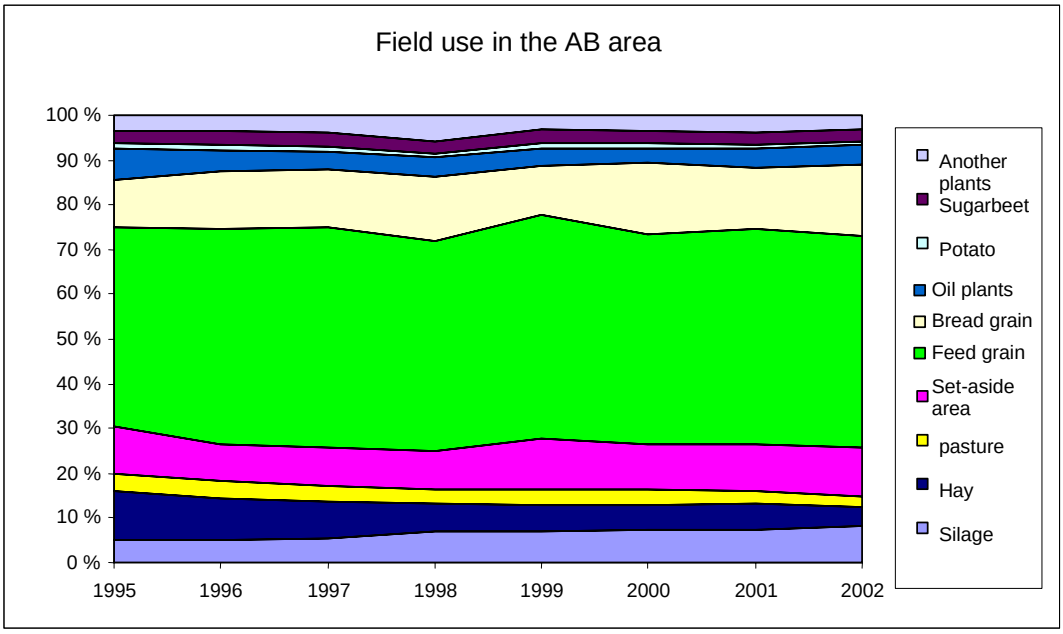

Figure 14. Distribution of field use (%) in the AB area in the period 1995-2002. (Tike).

1995-2002. Silage accounted for around a quarter of the grass feed area in 1995; this had grown to more than half of the grass feed area in 2002. The proportion of pasture and hay of the grass feed area [accounted for by pasture and hay] has correspondingly declined. The area of the AB support area's arable land under the other crops mentioned above has been around 3% (Figure 14).

In terms of crop production in the period 1995-2002, the outputs in the AB area remained the same or increased, with the exception of oil crops and hay (Table 8). Bread grain outputs increased by over 40% for wheat and by 20% for rye. Barley output was slightly lower in 2002, but in a several years production was higher than in 1995. Production of oats grew by more than 40%. Production of oil crops declined in 1996 to nearly a third and thereafter production did not return to its earlier level. In 1999 production of cereals and oil crops in the Southern Finland was substantially poorer than in the other years due to weather conditions. Production volumes of potato and sugarbeet remained nearly the same. Production of silage increased by more than half. The area of silage under cultivation has increased and areas of pasture and hay have decreased. The hay crop in 2002 was evidently exceptionally small due to unsettled weather conditions in the area, and in the period 1998-2001 it was nearly a half smaller than in the early years of the review period.

Table 8. Production (million kg) of the most important crops in the AB area in the period 1995-2002. (Tike).

	1995	1996	1997	1998	1999	2000	2001	2002
Wheat	360	450	450	390	240	510	460	510
Rye	50	80	40	40	20	90	50	60
Barley	970	1 100	1 180	830	800	1 150	1 040	900
Oats	580	690	700	590	500	790	720	830
Potatoes	260	250	270	210	250	260	240	260
Sugar beets	1 020	820	1 260	840	1 090	970	1 040	1 030
Silage	970	1 030	1 140	1 600	1 230	1 620	1 520	1 540
Oil seeds	110	70	70	50	60	50	60	70
Hay	470	470	370	220	230	230	250	180

3.2.1.3 Horticultural production

The area of horticultural production in the AB support area is around 9,840 ha, of which around 70% is devoted to the production of open-field vegetables and root crops, 30% to berries and 2% to greenhouse production. The area of horticultural production has declined by around 870 ha, i.e. 8%, in the period 1995-2002. The decline in production area occurred mainly in the area devoted to vegetables and root crops. The horticultural production area examined includes occupational horticultural production but does not include household gardens. The production area of vegetables and root crops as well as berries and fruits includes the entire production area according to the arable land register. The greenhouse production area, on the other hand, is according to the support register (Table 9).

Table 9. Cultivation areas (ha) of the most important horticultural crops in the AB support area in the period 1995-2002. (Tike).

	1995	1997	2000	2001	2002
Vegetables and root crops, ha	7 724	7 840	6 970	6 680	6 750
Change, 1995=100	100	101	90	90	90
- Carrot, ha		1 320	1 160	1 040	1 120
- Onion, ha		610	830	700	690
- Swede, ha		560	310	310	290
- Beetroot, ha		490	430	410	390
- White cabbage, ha		550	400	360	360
- Chinese cabbage, ha		240	160	140	120
Berries and fruits, ha	2 860	3 190	3 190	3 040	2 900
Greenhouse production, ha	176	172	192	188	189
- vegetables, %	39	41	43	45	46
- ornamental plants, %	61	59	57	55	54

The most common vegetables and root crops cultivated in the AB area are carrot, whose area in 2002 was 17% of the vegetable and root crop area, onion (10%), swede, beetroot and white cabbage (4-5% each), and Chinese cabbage (2%). In berry production, strawberry and currant are the most important products and, in fruit production, apples. In greenhouse production, 46% of the cultivated area was devoted to vegetables in 2002. In the period 1995-2002, the area of vegetables increased by 7% and the area of ornamental plants correspondingly decreased.

Production of several open-field vegetables and root crops was higher in 1997 than in other years of the review period (Table 10). As Finnish horticultural products are sold in the domestic market, a big crop generally results in a fall in producer prices and a contraction of cultivated area. In 1998 the area under cultivation decreased by 450 ha and, because the summer was too rainy, the volume of open-field production declined and producer prices on the domestic market continued to rise. The following year, 1999, was more favourable for horticultural production and production increased, with a consequent 15% fall in prices (see section 2.2.2.1). This had no great impact on the level of open-field production, because prices began to rise again in 2000.

In greenhouse production tomato and cucumber are the main vegetables. Tomato output in the AB area in the period 1995-2001 remained steady and cucumber production increased slightly (Table 10).

Table 10. Production (million kg) of the most important open-field horticultural crops and greenhouse vegetables in the entire country in the period 1995-2002. (Tike).

	1995	1996	1997	1998	1999	2000	2001
Open-field plants:							
Carrot, mill. kg	61	53	68	52	62	64	58
Onion, mill. kg	17	19	14	18	16	22	17
Swede, mill. kg	13	13	18	11	15	10	12
Beetroot, mill. kg	11	12	15	8	14	13	14
White cabbage, mill. kg	24	23	29	19	22	20	18
Chinese cabbage, mill. kg	9	8	9	8	8	8	6
Greenhouse production:							
Tomato, mill. kg	31	34	33	32	36	35	34
Cucumber, mill. kg	24	26	27	28	30	30	31

3.2.2 AB area production in relation to total national production and consumption

3.2.2.1 Livestock production

More than half of pigmeat and poultrymeat production originates in the AB area and nearly 80% of egg production. The area's share of egg production increased in the period 1995-2001 by around 10 percentage units. The AB area's share of milk and beef production, on the other hand, is less than a quarter, and this share appears to be decreasing. Sheepmeat production is small overall, but half of it takes place in the southern parts of the country and its production is particularly significant in the archipelago (Table 11).

Table 11. The AB area's share (%) of total national production of the most important livestock products in the period 1995-2001. (Tike, IACS Register).

Product	1995	1996	1997	1998	1999	2000	2001
Milk	27	27	26	25	24	24	24
Beef	27	28	28	28	26	24	23
Pigmeat	60	60	59	60	59	58	57
Poultrymeat	70	70	70	67	64	66	66
Sheepmeat	38	40	36	41	47	48	50
Eggs	67	72	71	73	74	73	76

Figure 15 presents the production levels of the most important livestock products in the AB support area and compares them with total national consumption in the period 1992-2001. AB area production accounts for around 30% of total national consumption of milk. Milk consumption here includes liquid milk and milk products. The AB area's production covered around 30% of beef consumption in 1995, but this had fallen to 26% in 2001. The AB area's corresponding share of pigmeat consumption was more than 60%.

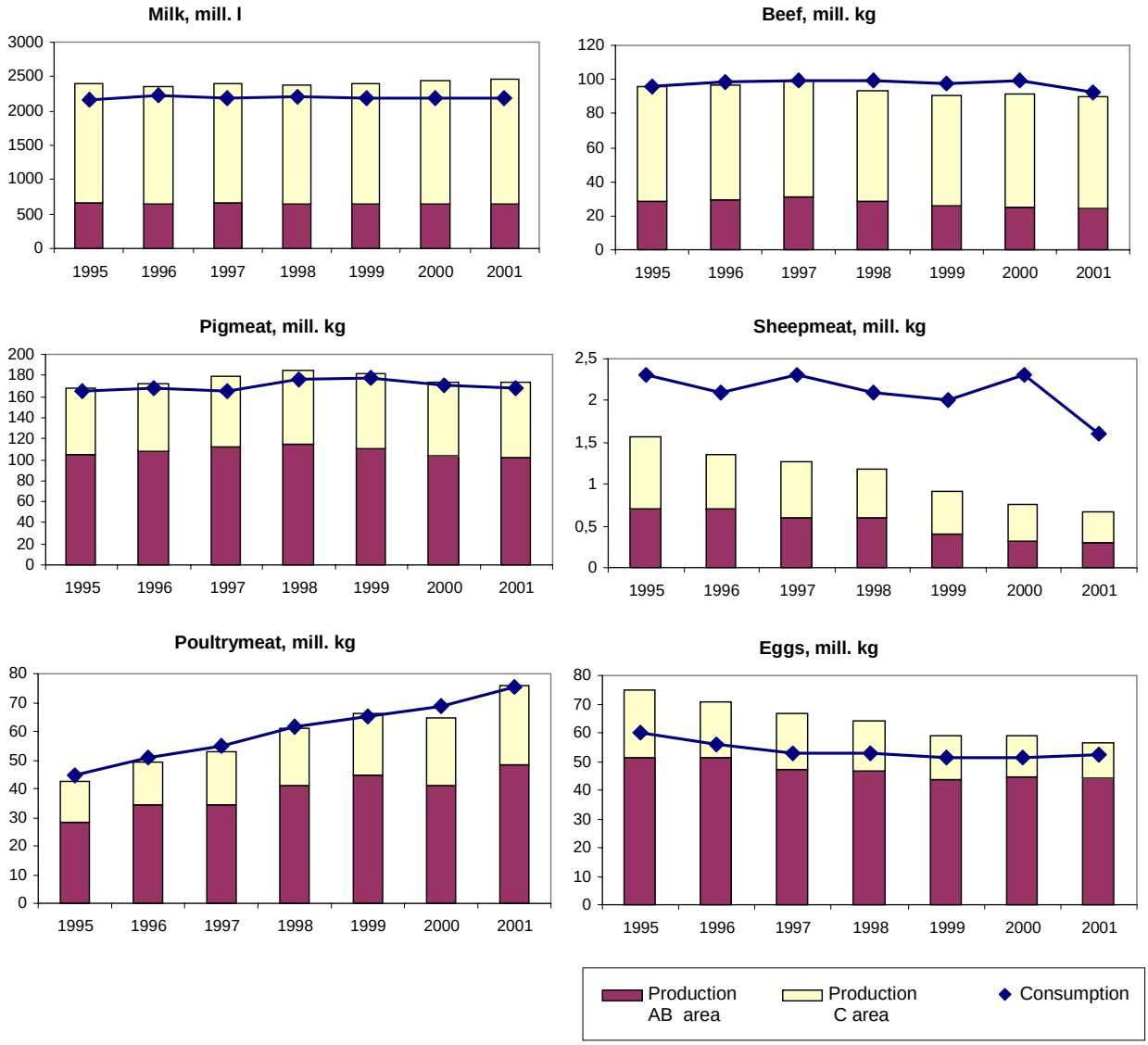

Figure 15. Production of livestock products in the AB support area and in the C area and total national consumption in the period 1995-2001. (Tike).

Production of poultrymeat in the AB area has increased along with growth in consumption; AB production accounts for between 60-70% of poultrymeat consumption annually. Sheepmeat consumption in Finland relies on imports and domestic production nowadays covers less than a quarter of it. In 1996 AB area production covered 30% of sheepmeat production, whereas the figure in 2001 was less than 20%. Egg production in the AB area accounts for around 85% of total national consumption. Egg production is stabilising at a level corresponding to consumption, and production exceeded consumption in 2001 by 12% (Finnish Agriculture 2002).

3.2.2.2 Crop production

The AB area's significance for crop production is illustrated by its share of total national production: the AB area's arable land includes nearly the entire country's output of wheat, malting barley and sugarbeet, most of the country's bread grain area, more than two thirds of the arable land devoted to rye and oil crops, but has less than half of the land that grows feed grain and starch potato. The AB area has more than a quarter of the area under grass and more than half of the fallow area, mainly related to grain production. The AB area has around 60% of the area of open-field horticultural production and 55% of the greenhouse area. In addition to Southern Finland, a significant level of greenhouse production is concentrated on the western coast of the C1 area.

The AB area's share of crop production area has declined during the period under review by 6 percentage units for feed grain and around 20 percentage units for oil crops, while its share of starch potato has increased by around 5 percentage units. Changes have been minor for other crops. (Table 12).

Table 12. The AB area's share (%) of total agricultural production area, fallow and horticultural production area for the most important crops in the period 1995-2002. (Tike).

	1995	1997	2000	2001	2002
Agricultural production:					
Wheat	96	98	95	94	92
Rye	75	77	79	75	76
Feed grain	50	47	44	44	45
Malting barley	95	94	92	91	90
Oilseeds	85	74	64	59	64
Sugar beets	90	91	92	92	92
Starch potato	35	34	40	40	40
Grass	26	26	27	27	26
Fallow	62	58	59	57	56
Horticultural production:					
Open field production	62	62	61	60	61
Greenhouse production	57	56	55	55	56

3.3 Entrepreneurial activity linked to agriculture and horticulture in the AB support area

3.3.1 Food processing companies and product marketing

In Southern Finland a significant proportion of the food industry is located close to the best agricultural area and population centres. In the late 1990s food processing centralised into larger production plants and in the AB support area, as in the country as a whole, the number of operating units has contracted strongly. There are 15 dairies or companies engaged in milk processing operating in the AB support area (Figure 16). This number will be reduced further during this and next year by two dairies. Plants engaged in milk processing in the AB area for the most part produce liquid fresh products (milk, buttermilk, cream, yoghurt), but also fresh cheeses and ice cream. The largest dairies process more than 150 million litres of raw milk a year and the smallest less than 10 million litres.

Of the largest abattoirs, 16 were in the AB support area in 1995, with five of these being poultry abattoirs. In 2003 only 12 of these abattoirs remain, because four of the area's cattle and pig abattoirs have been closed. The size of abattoirs in the area varies a lot. Of the AB support area's 13 abattoirs in 2001, the smallest processed 700 cattle and 5,000 pigs and the largest 50,000 cattle and 600,000 pigs. Around 2,000 cattle and 1,200 pigs were slaughtered in the Åland Islands. The capacity of abattoirs that process poultrymeat is 26 million animals in the largest unit and a few thousand in the smallest unit, in the Åland Islands.

The number of farm abattoirs has grown but the proportion of slaughtering undertaken by them is still only one per cent. In the AB support area there were 51 farm abattoirs in 2002 and 41 in 1995. Most farm abattoirs (over 80%) only process pigs. Four out of five pig abattoirs slaughter fewer than 1,000 pigs per year, ranging from 20 to 4,200 pigs. A number of farm abattoirs also have, in addition to meat processing and sales, some other small-scale further processing of foodstuffs.

The AB area is home to nearly 60% (91 units) of the whole country's egg packing plants. Most of the packing plants are small farm units that pack only the farm's own eggs. There are ten central packing plants in the AB area and three elsewhere in the country. The largest egg packing unit handles around 13 million kilos of eggs annually and the smallest less than one hundred tonnes.

Two fairly large food factories, producing mainly for the domestic market, are located in the AB support area as well as a biscuit and sweet factory that is strongly oriented towards the export market. These three plants employ around 4,500 people in total.

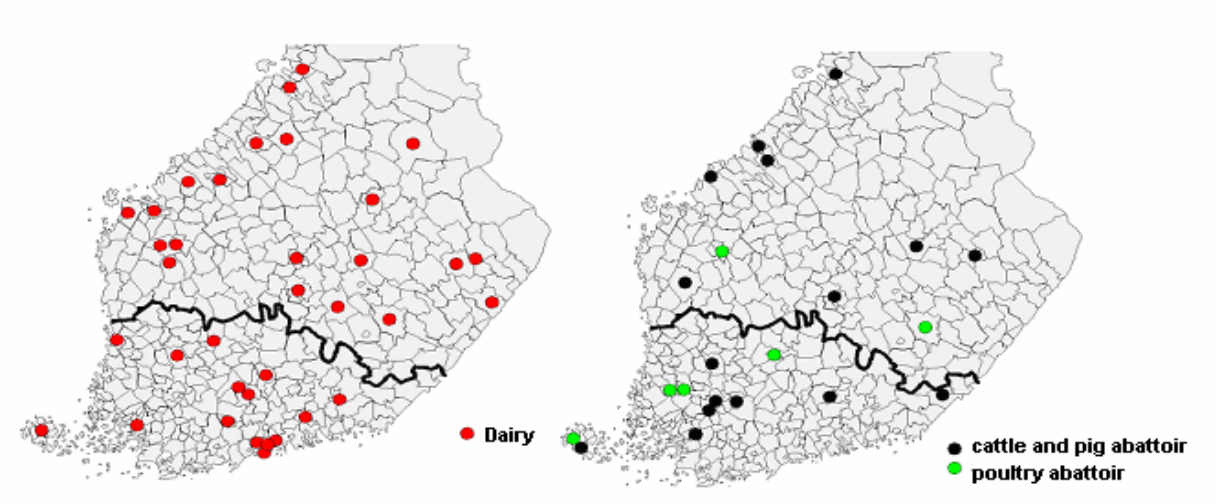

Figure 16. Dairies as well as cattle, pig and poultry abattoirs operating in the years 1995-2002. (Suomen Meijeriväenliitto MVL ry, The National Food Agency Finland).

3.3.2 Input-producing companies

Numerical data on companies that produce inputs for agriculture and horticulture in the AB support area can be examined using Statistics Finland's company register, which contains the number of company business units by municipality and sector. The company and business location register includes those enterprises which have been operating for six months, which employ more than half a person a year and which are liable for business tax, i.e. their turnover is at least 9,000 euros per year.

The most important of the company register enterprises that supply inputs to agriculture are companies that produce feed and fertiliser as well as companies that manufacture machinery and equipment. According to the company register most of these firms are small family companies. The number of feed-manufacturing companies has remained steady, but the number of feed and fertiliser outlets as well as the number of personnel has declined. The number of companies that manufacture and maintain agricultural machinery has declined, but in this sector the number of personnel has increased (Table 13).

Table 13. Number of business units of companies that produce inputs for agriculture and horticulture in the AB support area in 1994, 1999 and 2002. (Statistics Finland, Company register).

Line of business	Number of business units		change	Number of personnel		change	Persons/enterprise	
	1997	2000	%	1997	2000	%	1997	2000
Producing concntr. feed	15	14	-7	33	32	-3	2.20	2.29
Wholesale and retail shop	19	15	-21	38	21	-45	2.00	1.40
Producing fertilisers	2	2	0	5	4	-20	2.50	2.00
Wholesale and retail shop of fertilisers	16	18	13	32	22	-31	2.00	1.22
Preparing, installing and service of agric. machines	156	147	-6	142	154	8	0.91	1.05

3.3.3 Pluriactive farms

The practising of other business activity on farms is considered to be part of the diversification of rural business life. From a rural policy perspective, other business activity practised by farmers in addition to agriculture is considered important. However, as Haines and Davies (1987, p. 22) emphasise, unprofitable basic agriculture cannot be supported by other business activity and vice versa; and a company's operations must be profitable in all sectors.

Rural small business activity in the AB support area is already greater than in other parts of the country owing to the market area created by proximity to population centres. In small enterprises operating in connection with farms, the most important fields of business are further processing of foodstuffs, tourism and meal services, machine contracting and wood processing. Small enterprises that operate outside farms are typically engaged in commercial services in different sectors, road transportation, construction, manufacturing of metal products, the manufacture and repair of machinery and equipment, health care and social services, as well as other services.

The significance of rural small business activity in the AB support area has been examined using the Rural Small Enterprises' Register, which has been compiled by combining data from Statistics Finland's Business Register and the Tike's Farm Register. The Rural Small Enterprises' Register includes small business activity practised in connection with farms as well as small enterprises that operate in rural areas. Rural areas have been defined in the register according to postcode area. In rural areas the population density is less than 50 people/km^2. Other business activity operating in connection with farms has been defined as activity outside agriculture and forestry which has a turnover of at least 9,000 euros per year. Small enterprises in the register employ at least 0.5-20 people per year and have one place of business or all places of business in a rural area.

In 2000 there were around 3,150 small enterprises operating in connection with a farm in the AB support area, representing 39% of all such enterprises in Finland as a whole. In the period 1997-2000, the number of pluriactive farms in the AB support area increased more than the average in the country as a whole (Table 14). The most common fields of business on pluriactive farms are machinery contracting, which is classed as primary production, industrial subcontracting and tourism services. Relatively the biggest increase has been recorded by business activity relating to primary production. In 2000, pluriactive farms employed around 3,600 people in the AB support area and in the period 1997-2000 the workforce on these farms grew by around a third. Pluriactive farms are still mainly one-person companies, with most primary production enterprises employing 1-2 people.

Table 14. Number of pluriactive farms and their personnel in the AB support area in 1997 and 2000. (Rantamäki-Lahtinen 2002, Rural Small Enterprises' Register).

Line of business	Number of enterprises			Number of personnel			Persons/enterprise	
			change			change		
	1997	2000	%	1997	2000	%	1997	2000
Primary production	661	753	14	1 014	1 191	17	1.53	1.58
Industry	1 010	1127	12	750	1 076	43	0.74	0.95
Marketing	288	317	10	211	287	36	0.73	0.91
Services	859	951	11	706	1 061	50	0.82	1.12
AB area total	2 818	3 148	12	2 681	3 615	35	0.95	1.15
Whole country	7 408	8 039	9	6 528	8 937	37	0.88	1.11

In 2000 there were around 21,200 rural small enterprises operating outside agriculture in the AB support area, which represents 37% of such enterprises in Finland as a whole. Of these, 42% operate in the service sector, 34% in industrial sectors, 18% in commercial fields and 6% in primary production. In the AB support area, 36,200 people worked in small companies. In the primary production sector, the number of companies and personnel has declined by more than 10%. The number of enterprises has also declined in the commercial sector, but personnel numbers in this sector have increased. In the industrial and service sectors, the number of enterprises and personnel has increased (Table 15).

Table 15. Number of rural small enterprises operating outside farms and their personnel in the AB support area in 1997 and 2000. (Rantamäki-Lahtinen 2002, Rural Small Companies Register).

Line of	Number of enterprises			Number of personnel			Persons/ enterprise	
			change			change		
business	1997	2000	%	1997	2000	%	1997	2000
Primary production	1 320	1 182	-10	2 343	2 058	-12	1.78	1.74
Industry	6 998	7 209	3	13 594	14 710	8	1.94	2.04
Marketing	4 143	3 891	-6	5 585	5 778	3	1.35	1.48
Services	8 289	8 910	7	12 084	13 673	13	1.46	1.53
AB area total	20 750	21 192	2	33 606	36 219	8	1.62	1.71
Whole country	54 374	56 582	4	87 162	96 765	11	1.60	1.71

3.4 The national economic significance of Southern Finland's agriculture and food industry

The significance of the AB support area's agricultural and horticulture and food industry is examined below from the perspective of key national economic figures based on research by Knuuttila (2001, 2002), which is based in turn on Statistics Finland's provincial input-output data and national economic accounting material. In national economic accounting the agricultural sector includes agriculture proper and activity that serves agriculture. The examination can be made according to a provincial division (Figure 17).

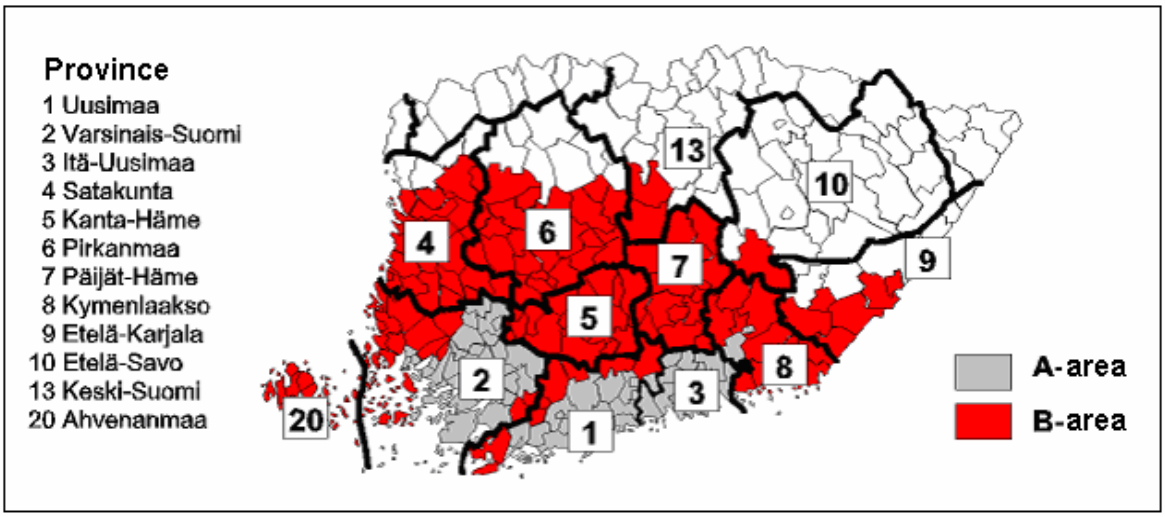

Figure 17. The provinces approximating to and bordering the AB support area.

The Southern Finland area, which approximates to the AB support area, is defined by the nine provinces that appear in Figure 17 plus the autonomous area of the Åland Islands (the Uusimaa, Varsinais-Suomi, Itä-Uusimaa, Satakunta, Kanta-Häme, Pirkanmaa, Päijät-Häme, Kymenlaakso and Etelä-Karjala provinces and the Åland Islands).

3.4.1 Agriculture and food industry's share of gross domestic product

The area of Southern Finland defined above accounts for 70% of the whole country's gross domestic product and 67% of employees, but only 20% of Finland's surface area. Excluding Kanta-Häme, the GDP per inhabitant in the area's provinces is higher than in the other provinces of Finland. Of other areas in Finland, the same group is only matched by the coastal district of Vaasa and Pohjois-Pohjanmaa.

The GDP of agriculture and the food industry in the Southern Finland area was 2,308 million euros in 1995 and 1,919 million euros in 2000. Agriculture's share of this in 2000 was around 30% and the food industry's share 70%. The food sector in the Southern Finland area employed around 76,000 people in 1995 and 66,100 in 2000. The food industry's employees are divided between Southern Finland and the rest of Finland in almost the same ratio as employees overall. Some 66% of the whole country's food industry employees work in the Southern Finland area. The number of agricultural employees in the area has declined in the period 1995-2000 by 18%. In 2000, agriculture employed around 39,300 people in Southern Finland. The food industry for its part employed 26,800 people in 2000, namely 13% less than in 1995.

Table 16. The agriculture and food industry % shares of province/area GDP and employment in the Uusimaa and Kanta-Häme provinces and the Southern Finland area in 1995 and 2000.

	1995	2000	1995	2000	1995	2000
	Uusimaa		Kanta-Häme		South. Finland Total	
Of the GDB, %:						
- Food industry	2,2	1,2	5,9	3,4	2,7	1,6
- Agriculture	0,2	0,1	3,0	2,0	1,4	0,7
Of the employment:						
- Food industry	1,6	1,2	4,5	3,4	2,2	1,8
- Agriculture	0,8	0,6	7,5	5,4	3,8	2,6

Examined using all national economic indicators, the significance of agriculture and the food industry in the area's economy has declined. The decline in the food sector's significance results from growth in other sectors of the area's economy and partly from a real contraction of the food sector itself. Both the GDP shares and the proportions of people employed for agriculture and the food industry declined in the period 1995-2000 in all of the provinces of Southern Finland area. Table 16 presents the GDP shares of the food industry and agriculture for Uusimaa and Kanta-Häme as well as the total for the provinces corresponding to the AB support area. The GDP share of agriculture is smallest in Uusimaa and biggest in Kanta-Häme.

The food industry's share of the area's GDP varied in 2000 between 1.2% in Uusimaa and 3.4% in Kanta-Häme, with the corresponding shares for agriculture being 0.1% and 2.0%. Southern Finland's large share of GDP and agriculture's low share in it are indicative of the more diverse activity of other production in the area than in other parts of the country. Despite this, within five provinces (Varsinais-Suomi, Kanta-Häme, Itä-Uusimaa, Satakunta and the Åland Islands) the significance of agriculture in the area economy is greater than the average for the country as a whole. The significance of agriculture in the area of Southern Finland is thus very different in different parts of the area.

3.4.2 Agricultural labour force and employment in the AB support area

The size of the labour supply describes an area's labour potential and is thus one of the key resources for the development of an area. The labour force includes both the employed and unemployed. Changes in the labour force have been examined below for the provinces corresponding to the AB support area (see section 3.4, figure 14). The labour force in the provinces of Southern Finland was around 1,706,000 people in 2002, of which 7.6% were unemployed (whole country 2,610,000 people and 9.1%). The area's unemployment rate has declined during the period 1994-2002 from 15.7% to 7.6%. The unemployment rate has been 1-2 percentage units lower than the average rate for Finland as a whole throughout the entire period. The number of people employed in Southern Finland has grown in the period under review by around 19%, i.e. by 256,000 people (whole country 15% and 318,000 people).

Table 17. Number of people employed in agriculture, game and fishing and the % share of the total employed population in Southern Finland in the period 1994-2000. (Statistics Finland, labour statistics).

Year	Southern Finland Employed population total		Southern Finland Agriculture, game and fishing		
	1 000 persons	1994=100	1 000 persons	1994=100	% share
1994	1 321	100	62.9	100	4.8
1995	1 358	102	57.7	92	4.2
1996	1 377	104	51.6	82	3.7
1997	1 418	106	54.7	87	3.9
1998	1 461	108	48.1	76	3.3
1999	1 518	112	52.2	83	3.4
2000	1 548	114	50.7	81	3.3
2001	1 572	115	50.1	80	3.2
2002	1 578	115	46.9	75	3.0

Agriculture, game and fishing employed 153,000 people in the whole country in 1994 and just 106,000 people in 2002, representing a decrease of more than 30%. Agriculture, game and fishing's share of those employed in the whole country correspondingly declined from 7.4% to 4.5% in the period under review. In Southern Finland the number of people employed in agriculture, game and fishing decreased in 1994-2002 from 63,900 people to 46,900 people, i.e. 25%. At the same time, the share of the total employed population in the area accounted for by people employed in agriculture, game and fishing declined from 4.8 % to 3.0 % (Table 17).

3.5 Socio-economic environment in the AB support area

3.5.1 Size, structure and change of population in Southern Finland

The size, structure and changes of the population in the AB support area have been examined below using a province division that approximates to the area (see map in section 3.4) and based on Statistics Finland population statistics and research on population ageing and welfare services (Nivalainen & Volk 2002). In 2001 63% of Finland's population lived in the Southern Finland provinces corresponding to the AB support area. The country's largest population centres are located in the area, namely: Helsinki and its surrounding cities (971,800 inhabitants) in Uusimaa, Turku (173,700 inhabitants) in Varsinais-Suomi, Tampere (197,900 inhabitants) in Pirkanmaa, and Lahti (97,700 inhabitants) in Päijät-Häme.

In recent years, the population of the provinces corresponding to the AB support area has grown by 1.7%, whereas it has declined in other parts of the country (Table 18). Due to migration the population increases have been relatively greatest in population centres with the largest populations, namely in Uusimaa and Pirkanmaa, as well as in Varsinais-Suomi. Rural municipalities surrounding the major cities have also shared in the population growth. In provinces suffering falls in population, the losses arise mainly from the emigration of working age inhabitants, although in these provinces the natural wastage in population is also greater than fertility (Nivalainen & Volk 2002).

Table 18. Size and age structure of population in the provinces corresponding to the AB support area in the period of 1998-2001. (Statistics Finland, Altika, Nivalainen & Volk 2002).

	Change, % 1998-2001	Change, people 1998-2001	Population total 2001	Age structure in 2001			
				0-14 years	15-64 years	65-74 years	75- years
Uusimaa	3.4	43 800	1 318 300	18.4	70.2	6.4	5.0
Itä-Uusimaa	2.3	2 000	90 200	19.9	65.7	7.9	6.5
Varsinais-Suomi	1.4	6 200	449 300	17.2	66.6	8.8	7.4
Satakunta	-1.9	-4 500	236 300	16.9	65.6	9.7	7.8
Kanta-Häme	0.4	600	165 500	17.9	65.0	9.3	7.8
Pirkanmaa	2.1	9 100	450 700	17.3	66.9	8.8	7.0
Päijät-Häme	0.1	200	197 700	17.2	66.9	9.0	6.9
Kymenlaakso	-1.6	-3 100	186 700	16.5	65.8	10.0	7.7
Etelä-Karjala	-0.8	-1 100	137 000	16.2	65.9	10.2	7.7
Ahvenanmaa	1.5	400	26 000	18.6	65.0	8.0	8.4
AB-area total	1.7	53 700	3 257 800	17.7	67.8	8.0	6.4
Other parts of the country	-1.0	-18 500	1 937 100	18.7	65.3	9.0	6.9
Whole country	0.7	35 300	5 194 900	18.1	66.9	8.4	6.6

The population structure of Southern Finland is currently strongly weighted towards people of working age. In contrast with other provinces, the area has particularly many 25-39 year olds, which is a result of the strong migration into the area. On the other hand, there are still relatively few pensioners. As the baby boom generation ages, the proportion of elderly people will grow and at the same time the population pyramid will narrow and assume a uniform thickness. The proportion of children and people of working age will decline from current levels, but due to the continuing migration surplus the demographic focus of the area will remain on the 20-39 year olds of working age. This is especially true for the province of Uusimaa (Nivalainen & Volk 2002).

3.5.2 Rural types in the AB support area

The AB support area is characterised by the location of the large population centres in the area, but it also has a rural heartland and sparsely settled areas. The area has much countryside close to the cities not only on the coast but also on the Helsinki-Tampere axis. The population centres are very significant for the employment opportunities of the rural areas close to them. The AB support area also has remote areas, where agriculture is a very important employer.

According to a rural classification based on population density and socio-economic status prepared by Keränen et al. (2000), 12% of Southern Finland municipalities belong to remote rural areas, 44% to rural heartland areas, 27% to rural areas near cities and 17% are towns or cities. In 1995 agriculture in the remote rural areas of Southern Finland employed 20% and in the rural heartland areas 17% of the employed labour force. In 2000 agriculture's share of those in employment had fallen in both areas by more than 5 percentage units. Agriculture remains highly significant for the employment of the population in remote rural and rural heartland areas. Agriculture's share of those in employment in the rural areas near to cities has been smaller and it has not declined to the same extent as in the other rural areas (Table 19).

Table 19. Agriculture's share of people in employment in different rural areas in Southern Finland in 1995 and 2000. (Keränen et al. 2002)

	Share of agric. in employment, %			Population density		
	1995 %	2000 %	Change % units	1995 inhab/km^2	2000 inhab/km^2	Change % units
Remote rural areas	20.4	14.5	-5.9	6.4	6.1	-0.3
Rural heartland areas	16.8	11.7	-5.1	14.7	14.4	-0.3
Rural areas near cities	8.4	5.5	-2.9	30.4	31.3	0.9
Cities	0.6	0.4	-0.2	269.7	282.0	12.2
South.Finland average	3.6	2.3	-1.3	49.9	51.5	1.6

The population density in remote rural areas, even in Southern Finland, is low, namely 6 inhabitants/km^2 and in the rural heartland areas 14 inhabitants/km^2. The average population density for the entire country is 15 inhabitants/km^2. Except for Sweden, the average population density in other EU countries is over 50 inhabitants/km^2. The rural areas near to cities are more settled even in Finland and the population density in the cities of Southern Finland is more than 280 inhabitants/km^2 (Table 19).

3.6 The development of the state of the environment in the AB support area

3.6.1 The quality of the environment

The quality of the environment is often examined using changes in soil and air quality, nutrient emissions and changes in natural diversity. The terms of agri-environmental support oblige farmers to take factors relating to environmental quality into account. In the AB support area, 93% of farms and 97% of arable land falls within the sphere of environmental support. Factors relating to environmental quality are monitored in connection with evaluations relating to the payment of environmental support and the aid scheme. Through EU membership, studies of environmental quality have increased considerably in Finland. For the monitoring of environmental quality has been developed a wide range of indicators, which are renewed every few years. Environmental changes in the AB support area are examined below on the basis of the latest report prepared by environmental research institutes. The report has been commissioned by the Ministry of Agriculture and Forestry and it will be published soon (Natural Resource Indicators 2003).

The escape of nutrients from production processes into waterways is one of the biggest environmental issues for agriculture. Wastewater treatment by communities and industry has been enhanced, so there is greater focus on the importance of measures undertaken by agriculture itself. Agriculture has made a great efforts to reduce the loading of waterways. As far as the waterways are concerned, both nitrogen and phosphorous are important, because in many of Finland's inland waters phosphorous limits the growth of algae and aquatic fauna, whereas the marine areas are nitrogen limiting. During recent decades, direct run-off from manure pits has, as a rule, been stopped and the focus has shifted to aspects of field cultiva-

tion. At the same time, a stage has been reached where changes in the level of loading are slow. The impacts of the agri-environmental support scheme are currently apparent in a reduction of the amounts of nutrients used and in a halting of the growth of nutrient concentrations in the soil. (Natural Resource Indicators 2003).

Phosphorous passes from farmland into run-off waters both in solution and bound to soil particulates. The loading risk posed by dissolved phosphorous in field run-off grew during the 1990s, but this trend now seems to have stopped. There is no sufficiently long and consistent time series on phosphorous load from fields, but based on the available data it is possible to estimate that phosphorous in the soil has fallen in terms of the highest concentrations, which has also been an objective of environmental support. The passing of phosphorous bound to soil particulates from the field into the waterways is, on the other hand, closely connected with erosion, which has also been tackled more effectively than before through the environmental support scheme.

The nitrogen balance describes the amount of nitrogen left in the soil after a growing season and which runs the risk of being leached into the waterways. Nitrogen leaching can best be reduced by growing crops that take up nutrients late in the autumn. Such crops are grasses, autumn cereals, undergrowth and intermediate crops and green fallow (Figure 18).

Taking the country as a whole, the nitrogen balance declined over the decade by 46%. The biggest factor has been the reduction in the use of concentrated fertiliser nitrogen by around a quarter. The amount of nitrogen that comes from cattle manure mainly depends on the number of cattle in the area. Nitrogen coming from cattle manure has been reduced by 12%. Annual crop variation results in fluctuations in the balance figures, because nitrogen uptake can be weaker when, for example, the summer is dry. The nitrogen balance figures in the rural centres' area corresponding to the AB support area have fallen in ten years by 32-58%, depending on the area. In 1999 the area had an exceptionally dry summer, which is evident also in the elevated nitrogen balance figures. (Natural Resource Indicators 2003, Turtola 2003).

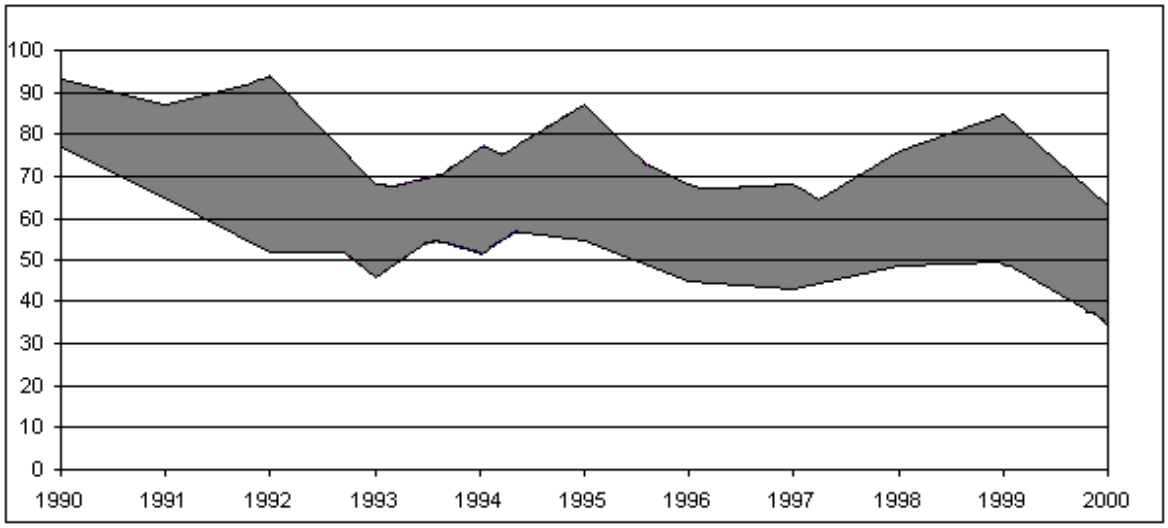

Figure 18. Total nitrogen balance (kg/ha), including the use of artificial fertilisers and cattle manure, in the Rural Centres corresponding to the AB support area in the period 1990-2000. (MTT/Turtola 2003).

3.6.2 Use of fertilisers and pesticides

The objective of the agri-environmental support scheme is to reduce the adverse effects of agriculture by, among other things, limiting and adjusting the use of fertilisers and pesticides in arable farming. The use of artificial fertilisers and pesticides is examined below in the light of national statistics, because no regional statistics are available on their use. The influence of the AB support area on total national sales of fertilisers and pesticides is substantial, as the AB area has more than half of the whole country's arable land area. According to fertiliser sales statistics, the use of all three main nutrients, i.e. nitrogen, phosphorous and potassium, in kilos per hectare of field area has declined since 1995. In the period 1990-2002 the reduction in nutrients has been 28% for nitrogen, 67% for phosphorous and 51% for potassium. (Kemira and Tike statistics).

The aim has been to target pesticides at certain pests, but even so they can also have an adverse effect on other organisms and the environment. In Finnish foodstuffs, the levels of pesticide residues have been very low (Natural Resource Indicators 2003). Overwhelming the largest group of pesticides used by agriculture consists of herbicides for controlling weeds. Sales of herbicides, calculated in terms of the effective agent, declined until 1996, after which sales have risen again slightly. Average sales of effective agent per year in the period 1995-2000 were 33% lower for herbicides, 11% lower for fungicides and 40% lower for insecticides than at the beginning of the decade. The long-term reduction of pesticides has been influenced, among other things, by the entry into the market of new types of product as well as by better information among growers about their appropriate use. (Plant Production Inspection Centre).

Biological protection has become common, particularly in greenhouse enterprises, more than 80% of which use biological protection against insect pests. Statistics on sales of biological protection organisms have been kept since 1996. During the last couple of years such sales have strongly increased; in 2001 sales of biological protection organisms more than doubled compared with the previous year. The expansion of organic cultivation is also reducing the use of pesticides and is increasing the significance of biological and other non-chemical means of protection.

3.6.3 Preserving the rural landscape

The southern parts of the country are characterised by the presence of large population centres, rural areas near to cities, extensive rural heartland areas, which are among the best production area in the country, and also remote rural areas, particularly in the eastern and central parts of the area. In the south and west the AB support area is bounded by the sea and by the vast Turku archipelago. The autonomous province of the Åland Islands forms an original landscape in the sea area between Turku and Stockholm. The AB support area has lots of rural areas of value from a cultural history perspective, with small manors and peasant milieus, because Finland was largely an agrarian society until the mid-20th century.

In 1995 the Government issued a decision-in-principle on the development of nationally valuable landscape areas and landscape management (YM 1992/66). The value of nationally valuable landscape areas is based on a managed farming environment, the building stock, and a diverse, culturally influential meadow and forest terrain encompassing highly diverse landscape structures. In southernmost parts of Finland there are 14 areas of national value, of which eight are extensive farming landscapes. The goal is to maintain the continuity of land use history and the culturally historical value of these areas by continuing to farm in the future. These national valuable areas are among the most impressive rural cultural landscapes. Monitoring and, if necessary, promotion of landscape care have a key role in maintaining these areas as examples of national landscape management. In Finland only 6.5% of the land area is arable land and thus every open field or pasture area is valuable in terms of the rural landscape. (Hietala-Koivu 2002).

The importance of a managed rural and cultural landscape is emphasised in the Southern Finland area as a counterweight to the presence of the large population centres. The area is also very important for tourism. The rural areas of Southern Finland are typified by open field areas that spread out around the farm homesteads and are themselves surrounded by forests and in certain places also by lakes. In the AB support area, fields have been given up for the needs of roads and settlements, but new fields have, on the other hand, been cleared. The afforestation of arable land has not been practised in the area at all.

4 Structural change in agriculture and horticulture in the AB support area

4.1 Structural change in agriculture and horticulture

Since the founding of the European Community, objectives relating to structural change in agriculture have focused primarily on developing agricultural productivity and the income level of the farming population. In connection with the Agenda 2000 reform, ensuring a reasonable standard of living and a stable income for the agricultural population as well as creating alternative income and employment opportunities alongside other development of rural areas were stated as objectives of the common agricultural policy. In national agricultural policy objectives outlined for the first decade of the 21st century, safeguarding the profitability and operating conditions for agriculture and improving the structure of agriculture with the aim of reducing unit costs are considered to be important.

Through structural policy, the aim is to promote the production of quality and safe products as well the introduction of production methods that improve the quality of the environment and the welfare of animals. Structural policy means must focus attention on the development of the market situation both domestically and internationally. Structural improvement is sought through means that promote generation changes and facilitate early retirement,

whereupon the optimum farm size is determined according to limitations set by the production sector and natural conditions and according to farmholders' own situation and capabilities (MMM 2001a, MMM 2001b).

Through EU membership, price and cost pressures and the consequent deterioration in agricultural productivity had the strongest impact on the structural development of agriculture. Four different lines of adjustment have been put forward in the structural development options for agriculture (Kuhmonen 1991, Niemi et al. 1995, cf. Puurunen 1998):

1) continuing operations as before,
2) increasing the farm size,
3) diversifying the structure of enterprises and
4) specialisation.

Farms that continue their production in the present way will have generally and for different reasons limited opportunities and resources for trying out alternative agricultural strategies. The ending point for these farms will probably be a growing need for new and replacement investments which they have no desire or capacity to fulfil. Increasing the size of farms has been an important means in the adjustment of farms, and the basic lines of agricultural policy and a number of decisions during the period of membership have committed to this. The need to increase farm size has been recognised widely among active farmers. Continuing agricultural production may also be possible on a relatively small scale, if the income derived from it can be supplemented by other sources of income. Change of production sector, for example, from livestock production to crop production or production of special products such as organic produce may facilitate some farms to continue with agricultural production.

4.1.1 Generation changes on farms and abandonment of production

The number of generation changes gives an indication of the continuity of agriculture and the long-term development of the production sector. No separate statistics on the total number of generation changes are kept in Finland, however. Aid for the setting up of young farmers and early-retirement support for farmers do not cover all of the generation changes. A significant proportion of them take place on farms where the retirees are already over 65 year old and on farms where the continuing farmers do not fulfil the terms for receiving setting-up aid. A third source for clarifying the number of change-of-generation farms is the register of farmers' pension insurance (MYEL) payments. The Farmers' Social Insurance Institution (MELA) has found that around 45% of the total number of new personal insurance policies arise from the acquisition of a farm. On this basis, the total number of generation changes has varied in recent years between 800 and 1,200 per year in Finland as a whole, and of these around 300-500 are in the Southern Finland area (Figure 19).

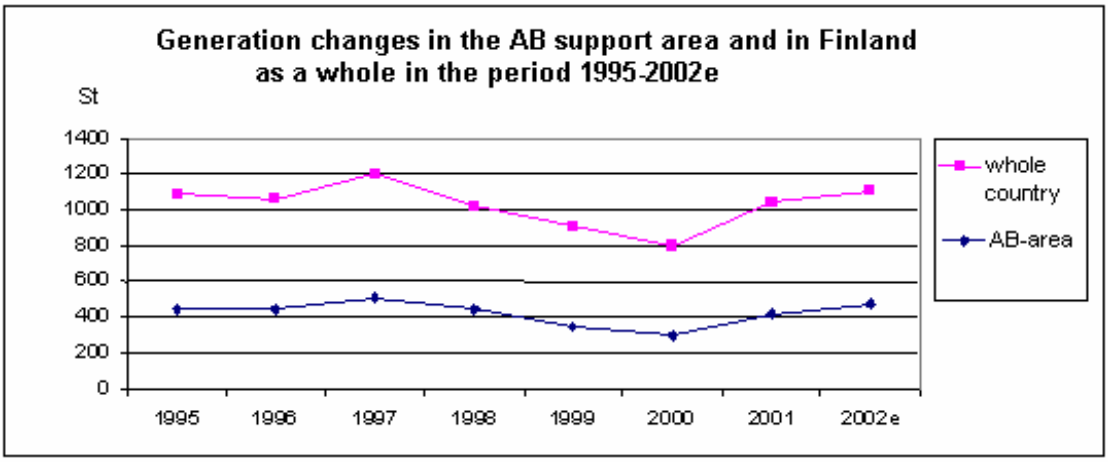

Figure 19. Generation changes estimated on the basis of MYEL insurance policies in the AB support area and in Finland as a whole in the period 1995-2002e. (MELA statistics, Tike).

Farmer surveys have been conducted on change-of-generation plans and these show that in the period 2000-2006 in Finland as a whole a generation change would take place on around 11% of farms, i.e. on around 1,300 farms per year. As the total number of farms in the country has been falling by around 3,500 farms per year, it is apparent that a generation change would be made on only around one third of the farms that abandon production. Most of the farms that are given up transfer to the continuing farmers are additional land transactions and otherwise than through generation changes (Pyykkönen 2001a). In certain farm-size groups, the tendency to give up farming is greater in Southern Finland, however, than in the north. One reason for this is uncertainty about the continuation of the aid scheme and, moreover, the alternative cost of labour is greater in the southern parts of the country than in other areas (Pietola et al. 2001). In the Southern Finland area active farmers are also older than in other parts of the country. The average age of farmers in Southern Finland in 2001 was 48.8 years, as opposed to an average age of 47.7 years in the country as a whole (Rural Business Register, TIKE).

Conclusions about the continuity of agriculture and about land remaining in cultivation within the area can be made from the manner of abandonment of farms that have come within the scope of early-retirement support. In the AB support area, around 6,500 farms came within the scope of early-retirement support in the period 1995-2000 (Table 20). A change-of-generation took place on around one third of these farms. Change-of-generation farms are generally larger than average. Over half of early retirement support farms, however, have gone to other farms as additional land. Most additional land transfers have been made under rental terms. Only the smaller farms have remain completely uncultivated.

Table 20. Different abandonment methods of early retirement support farms in the AB support area in the period 1995-2000. (Pyykkönen 2001b, MELA statistics).

	Farms, %	Field area, %	Aver. size, ha
Change-of generation	31	45	28,2
Additional land	52	44	16,2
Uncultivated	8	4	9,8
Additional land and uncultivated	9	7	14,5
Total	100	100	19,3

4.1.2 Change in number and size of farms and horticultural units

The structure of agriculture has changed rapidly in recent decades through a fall in the number of farms and an increase in farm size. Through increasing the farm size, farmers have sought better profitability for agricultural production and sufficient income to support a farming family. Up to the 1990s, structural change in agriculture and the increase in the average farm size were mainly achieved through the giving up of small farms. Structural change in agriculture within the AB support area and in different production sectors is examined below on the basis of statistics on the numbers of active farms compiled by TIKE, the Information Centre of the Ministry of Agriculture and Forestry. Active farms have available for their use at least one hectare of arable land or their economic size is at last 1 ESU (see Appendix 1, abbreviations). In 2001 the number of active farms was 3% larger than the farm figure according to the aid register. The main production sector of active farms is as declared by the farmer. Figures that describe structural change by production sector are presented in Appendix 5.

4.1.2.1 Change in farm structure on average in the AB support area

The number of active farms decreased by more than half in the AB support area in the 1990s. The biggest fall in farm numbers occurred in the early 1990s in the farm-size groups below 30 field hectares. In the period 1995-2001, the number of active farms in the AB support area declined by 9,700 farms, i.e. by 23% (-3.8% per year).

	Number of farms	Change in the number of farms no	%
1990	70 600		
1995	42 500	-28 100	-40
1997	38 800	-3 700	-9
2000	34 500	-4 200	-11
2001	32 800	-1 800	-5
Total		-37 800	-54

The average field area of active farms in Southern Finland grew from around 25 hectares to 32 hectares in the period 1995-2001. Nearly 60% of the increase in field area (7.68 ha) consisted of fields rented for the farm.

	1995	2001
Field area, ha/farm	24,68	32,36
from which rented, ha	5,60	10,13
share of rented area, %	22,7	31,3

4.1.2.2 Structural change in livestock farms

Livestock farms represented around 40% of the AB area's farms in 1995 and 30% in 2001 (Figure 20). Many of livestock farms have abandoned livestock production and are continuing as arable farms, and many have stopped agricultural production completely. The number of livestock farms has declined in the less than 50 hectare farm-size groups by a total of 6,700 farms and increased in the more than 50 hectare farm-size group by 600 farms. The fall in farm numbers has been around 40% in total. In the 5-20 hectare farm-size group, farm numbers have declined by around 65%, and around half of farms in the 20-30 hectare category have given up agricultural production or have changed production sector to crop production. Whereas in 1995 farms larger than 50 hectares accounted for 10% of the AB area's livestock farms, the corresponding figure in 2001 was 25%.

Structural change on dairy, beef and pig farms has been very similar; the number of farms with less than 50 hectares has declined sharply and the number of farms with more than 50 hectares has increased. In other sectors of animal husbandry only the number of farms in the more than 100 hectares category has increased slightly. The relative share of the production sector in question held by farms with more than 50 hectares increased in the AB support area in the period 1995-2001 as follows:

	1995	2001	Change, % units
Milk farms, %	7,7	20,5	12,8
Cattle farms, %	7,6	22,2	14,6
Pig farms, %	18,8	38,6	19,8
Other animal husbandry, %	11,8	20,3	8,5

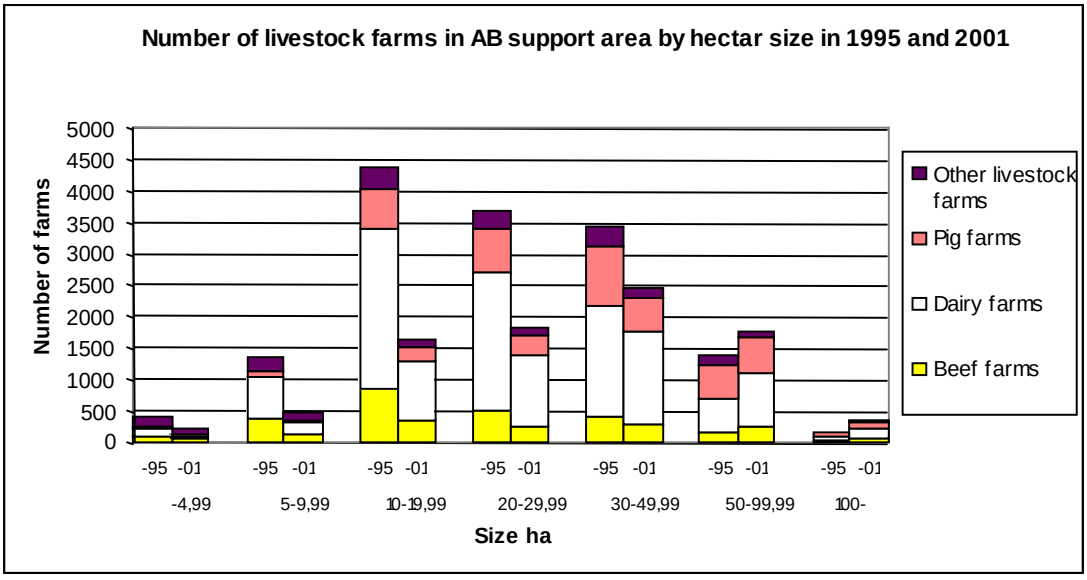

Figure 20. Number of livestock farms in the AB area in 1995 and 2001. (Tike).

Dairy farms

In milk production, the number of farms in the AB support area in the period 1995-2001 decreased by 39% (6.5% per year). In 2001 the number of dairy farms was 4,900. Farms with less than 20 cows have declined by more than half, and in 2001 they accounted for around 69% of dairy farms in the area. The proportion dairy farms represented by farms with more than 20 cows has increased and at the end of the period under review the figure was 31%. At the same time, the average size of dairy herds in the area has increased by a third, i.e. from 12.6 cows to 16.9 cows.

Most dairy herds had 10-19 cows in 1995. The numbers of farms and cows in this herd-size class have declined. Yet 10-19 cows per farm remains the most common herd size on dairy farms in the area. Whereas 74% of dairy cows were on farms with less the 20 cows in 1995, the corresponding figure in 2001 was 47%. The proportion of cow numbers accounted for by farms with more than 20 cows has increased from 26% to 53% (Appendix 5 Figure 1). Ten years earlier, there were only 35 dairy farms in the whole country with more than 50 cows, mainly located in Southern Finland, but there were more than 150 of such farms in 2000. In 2001 there were 63 farms with more than 50 dairy cows in the AB area, representing 1.3% of dairy farms in the area. These farms accounted for 5.2% of the total number of dairy cows.

Other cattle farms

In 1995 there were 2,300 farms specialised in beef production in the AB area and around 1,300 in 2001. In terms of animal numbers, the smallest units declined most in the period 1995-2001, the number of farms with 30-50 cattle remained stable and the number of units with more than 50 cattle tripled during the period under review. In the period 1995-2001, the proportion of farms with less than 30 cattle fell from 90% to 72% (Appendix 5 Figure 2). Moreover, nearly half of the cattle on beef farms in 1995 were on farms with less than 20 cattle, but in 2001 the corresponding figure was a fifth. Although the number of farms with 30-50 cattle did not change, their share of the total number of cattle rose from 7% to 12%. The proportion of all of the area's beef farms accounted for by the biggest farms, with more than 50 cattle, increased from 3% to 13%. Their share of animals grew correspondingly from 16% to 44%. In the period 1995-2001, the average size of beef farms grew from 14 animals to 24 animals.

Pig farms

In 1995 there were 900 farms specialised in pigmeat production in the AB support area and less than 500 in 2001. The strongest contraction in farm numbers occurred in the number farms with less than 400 fattening pigs. In 2001 their number had declined to less than 40%. The number of farms with 400-1,000 pigs has also decreased slightly. The number of farms with more than 1,000 fattening pigs, on the other hand, has increased from 7 to 22. The average size of fattening pig farms in the period 1995-2001 increased from 240 to 370 pigs.

Whereas 46% of pig farms in 1995 were in the 200-400 pig size category, in 2001 the corresponding figure was 28%, and the 400-1,000 pig farm-size category became the largest size category in terms of animal numbers, with 45% of all fattening pigs (Appendix 5 Figure 3).

In 1995 there were around 2,200 farms specialised in piglet production or combined piglet and fattening pig production in the AB area and the corresponding figure was around 1,200 in 2001. The largest decrease in farms engaged in piglet and combined production has occurred in farms with less than 50 sows. Their number has declined by 54% in the period 1995-2001. The number of 50-100 sow units has remained nearly the same, but the number of units with more than 100 sows has nearly tripled. Whereas earlier more than half of sows were in the less than 50 sow farm-size category, under than a third of sows were in the same category in 2001. In terms of animal numbers, the largest farm-size category is 50-100 sows, which accounted for more than 45% of sows in 2001. In the period 1995-2001 the average size of piglet and combined production units grew from 38 sows to 55 sows (Appendix 5 Figure 4).

Egg producing farms

The number of farms specialised in egg production fell in the period 1995-2001 by more than 60%. In 2001 there were 360 egg producing farms. Most of the egg producing farms in the AB area still have 1,000-5,000 hens. In spite of the sharp decline in the number of farms, the proportion of all egg producing farms in the area accounted for by farms of this size remained relatively stable; this farm-size category accounted for 57% of farms and 37% of hens in 2001. Over 80% of the smallest farms have discontinued egg production. In 2001 the number of farms with more than 5,000 hens had increased, accounting for 27% of egg producing farms in the area and 60% of hens. The average size of egg producing farms in the area increased in the period 1995-2001 from around 1,860 hens to 4,100 hens (Appendix 5 Figure 5).

Poultrymeat farms

The structural change in poultrymeat farms is examined here from the perspective of farms specialised in broiler production. In 2001 more than 80% of poultrymeat production was broiler production. The number of broiler farms in the AB area declined by a third in the period 1995-2001, with 77 farms remaining in 2001. The number of farms with less than 25,000 broilers halved, the number of farms with 25,000-50,000 broilers remained stable and the number of farms with more than 50,000 broilers nearly tripled during the period under review. The farms with less than 25,000 broilers earlier accounted for 54% of broilers, while in 2001 the corresponding figure was only 22% of broilers. The average size of broiler farms has increased from 21,000 broilers to 33,400 broilers (Appendix 5 Figure 6).

Sheep farms

The number of sheep farms in the AB area declined in the period 1995-2001 from around 400 farms to 300 farms. The proportion of farms with less than 100 sheep fell from 42% to 34%. Nearly half of the sheep, however, are raised on farms with more than 200 sheep. Previously this figure was less than 30%. In 1995 there were 330 farms whose main activity was sheep farming, while the corresponding figure in 2001 was 250 farms. Their average size increased from 69 to 85 in the same period. In terms of field area, sheep farms are quite small, even though their field area has increased on average from 11.0 hectares to 13.4 hectares.

4.1.2.3 Structural change in crop production farms and other farms

Cereal farms and special crop farms

The agricultural production of the AB area has become increasingly dominated by crop production. In the period 1995-2001 the proportion of farms in the area accounted for by crop production farms increased from 60% to 70%, because many farms that give up livestock production continue as crop production farms. In 2001 there were 21,000 crop production farms. The number crop production farms declined, however, by nearly 10% in the period in question. In the period 1995-2001 the proportion of farms with less than 30 hectares accounted for by crop production farms fell from 70% to 60%. The most significant fall in farm numbers in the less than 30 hectare farm-size category took place in farms producing sugarbeet and potatoes. On the other hand, the number of cereal farms has not changed in the less than 30 hectare farm-size category. This results from the conversion of small livestock farms into cereal farms.

Farm numbers in the 30-50 hectare farm-size category rose in the period 1995-97 but began to fall in 2000. In 2001, 20% of crop production farms were in this size category. The number of crop production farms in the more than 50 hectare farm-size category has increased by more than half, and there were 4,000 of such farms in 2001. The number of both cereal farms and special crop farms in the more than 50 hectares farm-size category has also grown (Figure 21).

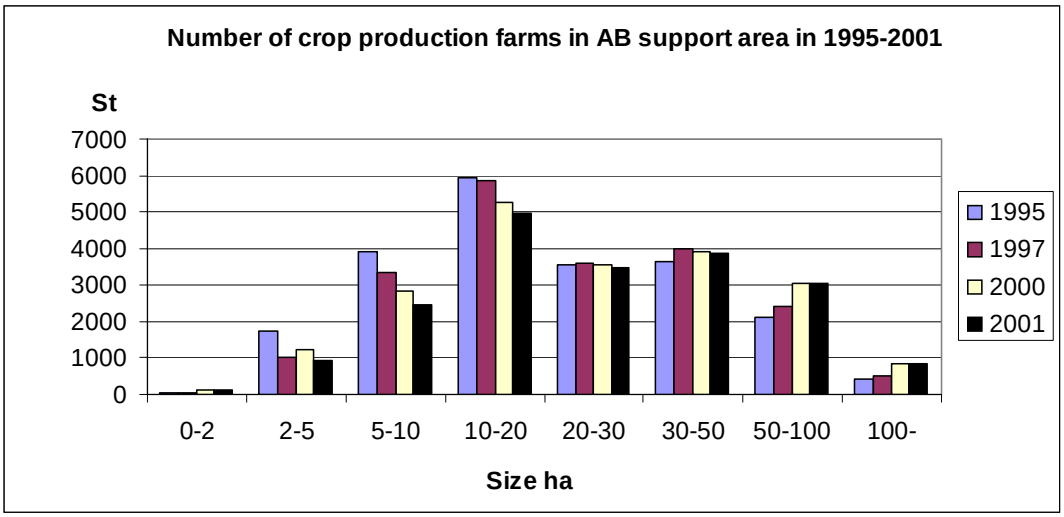

Figure 21. Number of crop production farms in the AB area in the period 1995-2001. (Tike).

Horticultural farms

A slightly different picture of the development of the number and structure of open-field vegetable farms is obtained depending on whether farm numbers are examined according to Tike's Horticultural Enterprise Register (PYR), the Farm Register or the Support Register. In 2001 the number of open-field vegetable farms was 3,000 in PYR, 860 in the Farm Register and 570 in the Support Register. The differences arise from the ways of defining farms in the registers in question; PYR covers all farms, including small ones, that are engaged in horticultural production for sale, farms in the Farm Register are included on the basis of main production line, while the number of farms in the Aid Register is restricted by the minimum area required to receive aid. Open-field vegetable farms are smaller in terms of field area than other crop production farms. The number of open-field vegetable farms on all of the above registers declined in the less than 10 hectare farm-size category and increased in the more than 10 hectare farm-size category. The proportion of open-field vegetable farms accounted for by farms in the more than 10 hectare farm-size category increased from 4% to 7% in the period 1995-2001 according to PYR and from 10% to 14% according to the other two registers.

The number of greenhouse production enterprises in the AB area fell by around 10% in the period 1995-2001. In 2001 the number of such enterprises was 1,630. The number of greenhouses of less than 2,500 m^2 declined by 18% to 1,180 units in 2001. The proportion of all farms in the area accounted for by greenhouses of more than 2,500 m^2 was 21% in 1995 and 28% in 2001. The average size of greenhouse enterprises increased in the same period by around 9%. The average size was 2,615 m^2 in 2001.

Organic production

The number of farms engaged in organic production grew in the AB support area from 2.5% to more than 6% in the period 1995-2001. The number of such farms totalled 2,050 in 2001. The number of organic farms in the AB area was at its highest in 1999, when their number reached approximately 2,200 farms (Figure 22).

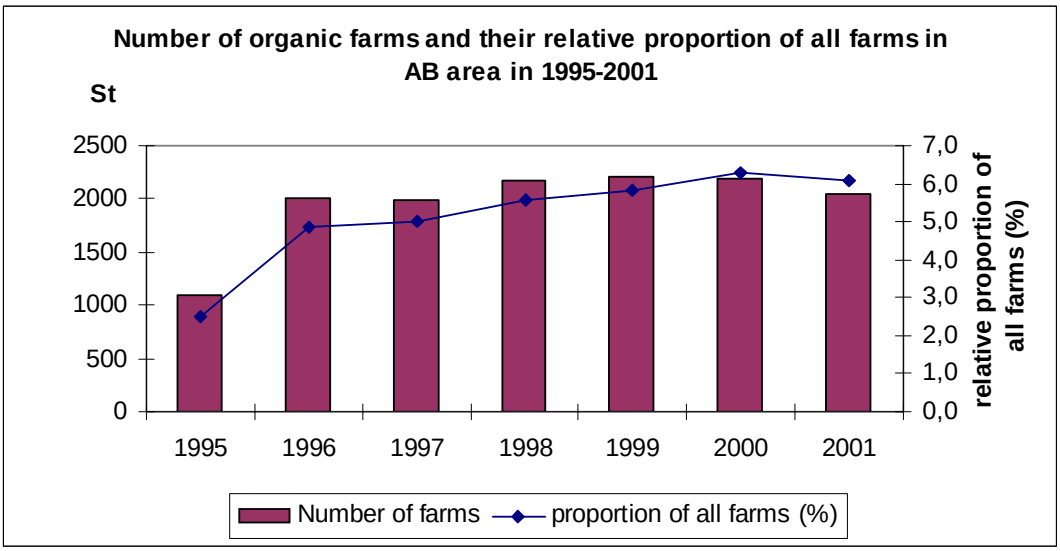

Figure 22. Development of the number of organic farms and their relative proportion of all farms (farms, %) in the AB support area in the period 1995-2001. (TIKE).

4.2 Structural change in agriculture compared with other EU countries

The structure of farms has changed such that farms of medium size and smaller have discontinued production and the number of farms larger than medium size has increased. The average farm size has grown, but despite this Finnish farms are smaller than those in competitor countries because the size of farms in these countries has also grown. The structural development of Finnish agriculture is strongly influenced by natural conditions and by a farm structure dominated by family enterprises, which has developed through time. In Finland objectives relating to increasing farm size cannot be set unrealistically to match the structural development of competitor countries; the optimum farm size must be determined according to limitations set by production sector and natural conditions as well as by the farmers' own situation and capabilities.

The structural development that has taken place on Finnish farms is compared below with the structural development of Finland's nearest Member States in the period 1995-2000 on the basis of the results of Eurostat structural research. Because the farm size distribution partly depends on how farm size is measured, a comparison has been made both on the basis of field hectares and on the European Size Unit included in the EU's farm typology.

4.2.1 Farm-size classification based on field hectares

A comparison according to field area classification only describes the opportunities for arable farming to achieve economies of scale, and it cannot be used to examine the structural development of livestock production. Figure 23 presents the percentage shares of the total number of farms in the area held by farms of more than 5 hectares based on a farm-size distribution according to field hectares. The number of small farms of less than 5-10 hectares

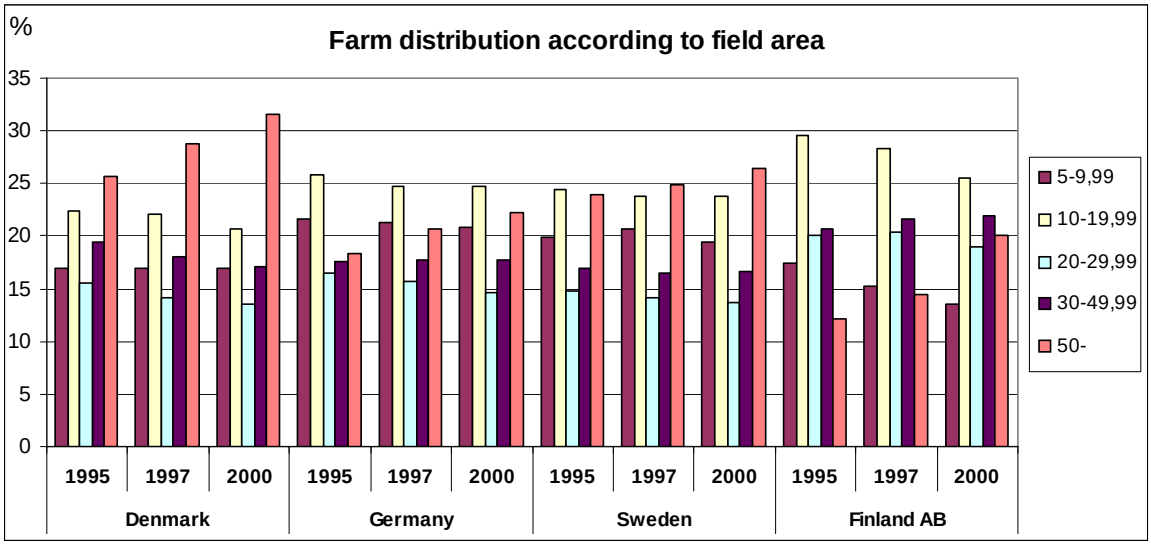

Figure 23. Farm distribution according to field area in Finland in the AB area and in comparison countries in the period 1995-2000. (Eurostat, Tike).

is quite high in the comparison countries, more than 15%, whereas in Southern Finland it is contracting, with the figure being 12% of farms in 2000. In Southern Finland and Germany the proportion of 10-20 hectare farms is the largest farm-size category, while in Sweden and Denmark the more than 50 hectare farm-size category is the largest. The proportion of farms of more than 50 hectares has increased in all of the comparison countries. In 2002, farms of more than 50 hectares accounted for 18% of all farms in Southern Finland, 17% in Germany, 23% in Sweden and 31% in Denmark.

In the period 1995-2000, the average field area has grown in Finland by 5.6 hectares and in the AB support area by 6.1 hectares, i.e. by 25%. The growth in farm size in Southern Finland is in terms of hectares the same as in Germany and Denmark. In relation to farm size, the growth in farm size in Southern Finland has been faster. Despite this, the farm size in the comparison countries is substantially greater than in Southern Finland. In 2000, Swedish farms were on average around 7 hectares, i.e. 23% larger, German farms 5.6 hectares, around 18% larger and Danish farms 15 hectares, nearly 50% larger (Table 21).

Table 21. Average farm size expressed as field hectares and % change figures in Southern Finland and comparison countries in the years 1995-2000. (Eurostat).

	1995	1997	2000	Change in 1995-2000	
	ha	ha	ha	ha	%
Finland	21,7	23,7	27,3	5,6	25,8
Southern Finland	24,6	27,2	30,7	6,1	24,8
Sweden	34,4	34,7	37,7	3,3	9,6
Germany	30,3	32,1	36,3	6,0	19,8
Denmark	39,6	42,6	45,7	6,1	15,4

4.2.2 ESU classification based on economic size

In the EU agricultural structure statistics, field size is also measured with the aid of the European Size Unit (ESU) concept, which describes the economic size of a farms using Standard Gross Margins (SGM), which take into account field use and the number of livestock. SGM is determined in euros and one ESU is 1,200 euros. The ESU farm-size classification makes it easier to compare livestock and arable farms operating in different areas of the Community than on the basis of number of animals or field hectares. The formation of a farm distribution according to the ESU farm-size distribution is influenced by the method of calculating SGMs, their reliability and updates.

The calculation of standard gross margin takes into account (e.g. per hectare of wheat) the market returns and aids directed at products as well as, in terms of livestock, per animal supports, including national aid. On the cost side, the standard gross margin calculation takes into account only part of the variable costs (Tiainen & Katajamäki 1996, FADN- methodology).

In theory the subsidised standard gross margin should be sufficient to cover the higher labour and capital costs due to natural disadvantage in Finland than in other countries. Thus in countries such as Finland which have high production costs due to natural conditions, farm size measured using standard gross margins is larger, owing to the calculation principles, than for farms of corresponding size in comparison countries. In terms of the structure of Finnish agriculture, therefore, the ESU classification gives a too optimistic picture. As such, the ESU classification is, however, the only classification available that allows different types of farms to be compared. The ESU classification works best in an economically homogeneous operating environment.

An examination of the structure of Finnish agriculture with the aid of a farm-size classification based on standard gross margins must take into account the exceptional calculation method of standard gross margins included in the 1995 structural study. EU agricultural structure research has applied in the calculation of standard gross margins three-year moving averages, but for the 1995 structural study in Finland and Sweden SGM figures had to be based on a single year's prices, because prices changed very sharply, especially in Finland, immediately in the early stage of membership. Thus, as far as Finland is concerned, the basis of the 1997 structural study can be considered more reliable that the basis of the 1995 study. As a result of this, possible uncertainty in the basis of any time series describing the structural development of Finnish agriculture must be taken into account when interpreting the figures.

In contrast with a hectare-based comparison, an ESU-based farm distribution comparison highlights Denmark's large livestock units and the overwhelming efficiency of Denmark's farm structure in the pursuit of economies of scale in agriculture. The examination below includes all farms of more than 4 ESUs. Figure 24 presents the development of the ESU-based farm-size distribution for different countries in 2000. In the period 1995-2000, the number of farms of more than 4 ESUs declined in the AB area in Southern Finland by 12%, in Sweden and Germany by 6%, and in Denmark by 16%.

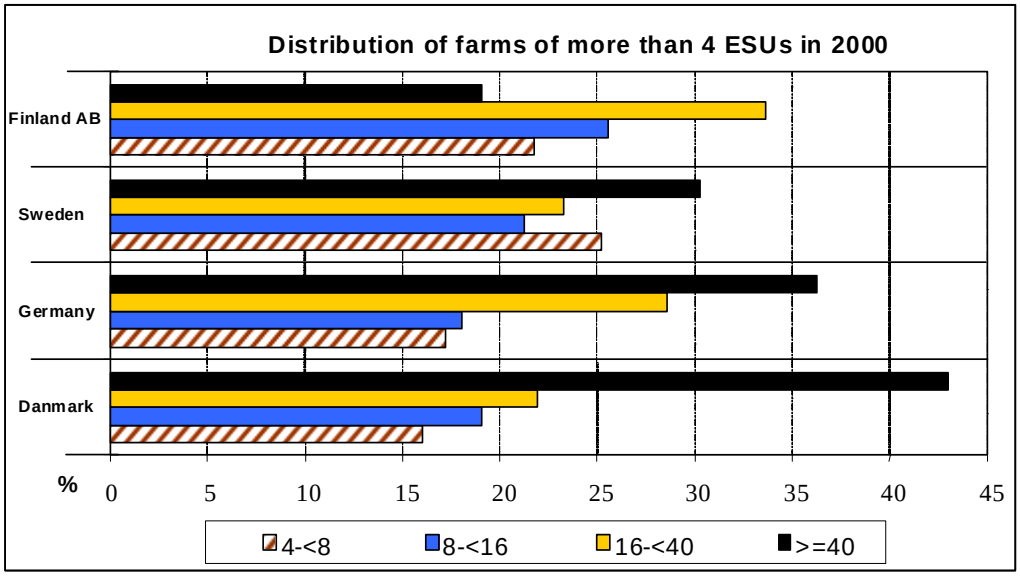

Figure 24. The % distribution of farms according to the EU typology (farms of more than 4 ESUs) in the AB support area in Southern Finland and in comparison countries in the period 1995-2000. (Eurostat, Tike).

An examination of the % distributions of farms reveals that the proportion of all farms accounted for by farms of more than 40 ESUs increased in the period 1995-2000 in all the comparison countries, including Denmark. The proportion of these farms has also increased in Southern Finland in the AB support area, but not so clearly as the proportions of larger farms have increased in the classification based on field hectares. The proportion of farms accounted for by the next largest farm-size category, 16-40 ESUs, has clearly declined in the comparison countries, but in Southern Finland the proportion of this farm-size category has remained almost unchanged. In contrast with the hectare-based classification, the proportion of smaller, 4-8 ESU, farms in the comparison countries has remained roughly as before, but in Finland it has declined.

In 2000, 19% of the farms in the AB support area in Southern Finland belonged to the largest farm-size groups of more than 40 ESUs. The corresponding figure in Sweden was 30%, in Germany 36% and in Denmark as much as 43%. In 2000, there were around 16,600 farms in Sweden, 129,900 farms in Germany and 23,300 farms in Denmark in this farm-size category. This compares with a corresponding figure of 5,300 farms in Southern Finland. The competitiveness of Danish agriculture is indicated by the fact that according to the 1997 structural study, for example, nearly a fifth of farms in Denmark (11,200 farms) was larger than 100 ESUs, while the corresponding figure in Germany was only 5% of farms (27,200 farms). In Finland, only 1.5% of farms (1,400 farms) fall into this farm-size category. The proportion of all farms accounted for by farms of more than 40 ESUs has increased in Southern Finland by 6% and in Germany by more than 7%, but in Sweden and Denmark the corresponding figures for these farms have increased by less than two per cent.

In predominantly livestock production, the farm size when measured in ESUs is generally larger than when measured in field hectares, and crop production the situation is often the reverse. In contrast with the examination according to field size presented above, in Eurostat small farms of less than 4 ESUs are also included in the figures that describe the average field size of different countries. In 2000 the average field size in Southern Finland was 22.7 ESU and 30.7 hectares. In 2000 Swedish farms were around 4 ESU, i.e. 15% larger, and German farms around 18 ESU (80%) larger than in Finland. In predominately livestock agriculture in Denmark the farms were actually 39 ESU larger, i.e. 2.7 times as big as the farms of Southern Finland (Table 22).

Table 22. Average farm size in ESUs in Southern Finland and in comparison countries in the period 1995-2000. (Eurostat).

	1995	1997	2000	Change in 1995-2000	
	ESU	ESU	ESU	ESU	%
Southern Finland	17,2	24,0	22,7	5,5	32,0
Sweden	23,1	22,8	26,2	3,1	13,4
Germany	27,9	32,3	40,7	12,8	45,9
Denmark	51,7	57,2	61,8	10,1	19,5
Compared with SF difference in ESUs:					
Sweden	5,9	-1,2	3,5		
Germany	10,7	8,3	18,0		
Denmark	34,5	33,2	39,1		

4.3 Significance of investment aids in promoting structural change in agriculture

4.3.1 Allocation of investment aids

The increase in farm size connected with the structural change of agriculture and the improving efficiency of production requires farmers to invest and to take risks in respect of the profitability of investments. Support for agricultural investments aims to accelerate the expansion of unit size and to improve production efficiency on farms. The most significant objective of investments aimed at expanding unit size and improving production efficiency is to achieve economies of scale. Investment aids are also intended to realise other objectives, relating to production quality, the ethical dimension of livestock production and improving the state of the environment. At the beginning of EU membership, besides investment aids partly funded by the EU, so-called normal national investment aids were also granted in Finland.

Investment aid reduced the portion of investment costs payable by the farmer and thus at the same time reduced the farmer's risk. Investment aid can be given as a grant, as an interest benefit attached to a government loan, an interest subsidy within an interest-rate subsidy loan or as a combination of these. Investment aids under Article 141 were granted in all respects up to the end of 2000. Of course the economic effects of structural changes achieved with

investments will only be apparent in profitability development in the years immediately following 2000. In terms of the structural development of the AB support area, the areas of application of investment aids in the period 1996-2002 are examined below on the basis of data from the Ministry of Agriculture and Forestry's structural aid register (Rahtu). In the AB area around 30,000 investment decisions have been made and, based on these decisions, aid either in the form of a grant alone or an interest subsidy or both have been granted. The number of investment aid decisions compiled in the Rahtu register indicates the farms which have received support.

In terms of euros, the most investment aid was granted at the beginning of the period under review for pig units and cowshed investments, and in the period 1998-2000 for dryer investments (Figure 25). In 1998 many grants were awarded for machines acquired for the joint ownership of farmers, but aid for jointly owned machines was changed into an interest-rate subsidy. In recent years, investment aid has been granted more for the purchase of additional land to support the structural development of farms than for the other purposes mentioned above. Investment has been made in machinery halls to a significant extent. The number of environmental investments was considerable in terms of the number of decisions at the beginning of the review period, but in terms of monetary value these aids have been quite small. The environmental investments were not deemed subjects for aid under Article 141.

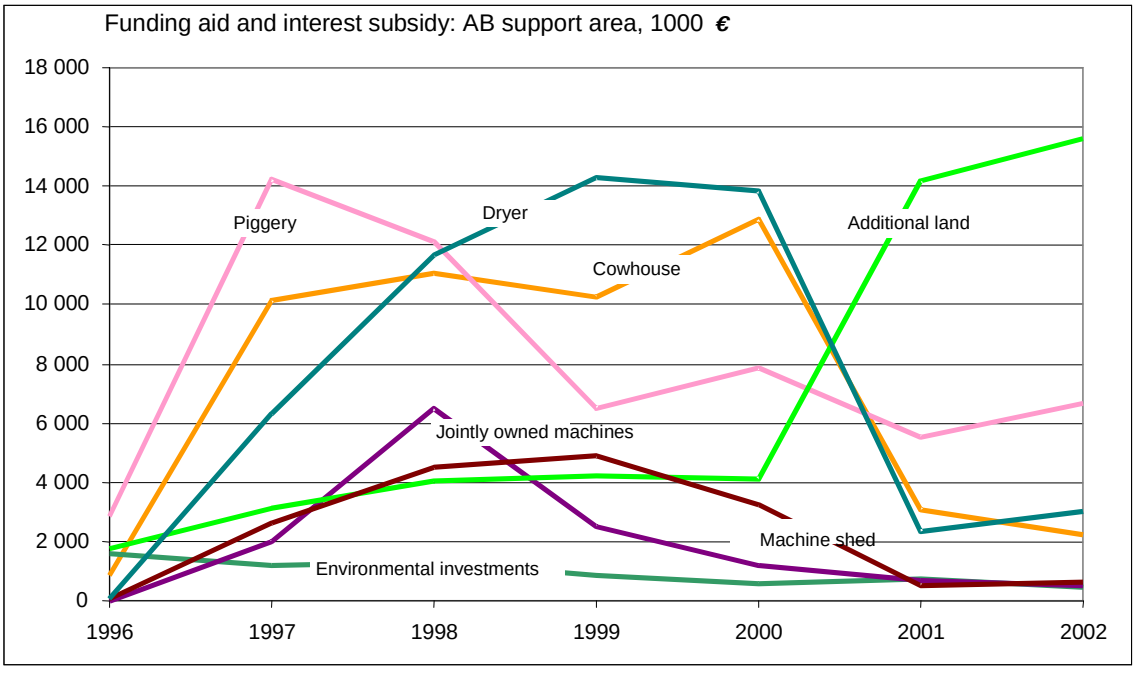

Figure 25. Investment aid (1,000 euros) for the most important investment objects granted in the AB support area in the period 1996-2002. (Tike, Rahtu register).

4.3.2 Significance of aid for farmers' investment plans

The significance of aid for farmers' investment plans and their implementation is examined below on the basis of an extensive survey of farmers conducted in autumn 2002 relating to the development outlook for agriculture. The survey was conducted by the market research company Food and Farm Facts Ltd. The survey investigated farmers' investment behaviour, realised building investments and investments plans as well as the significance and impact of production and investment aids on investment behaviour. A total of 3,500 farmers were targeted in the survey and 1,575 farmers responded. The results of the survey have been weighted to correspond to the number of active farms in the area.

According to the survey, half of the farms in the AB support area have made investments during the last five years. Of the farms who made construction investments, around 45% have built new, 40% have renovated and 15% have extended production buildings. In addition to the construction investments examined here, the farmers have also invested in the acquisition of movable property and land. Of the new buildings, two thirds were machine halls and nearly one fifth were dryers; more than a half were renovations of old buildings and extensions of these. Next most common were repairs and extensions to pig units and dairy herd cowsheds (Table 23). The farmers' survey did not distinguish those who had received investment aid into a separate group, so the results of the survey are not directly comparable to the number of investments according to the funding aid register.

It appears that farmers' willingness to invest in construction will continue in the next few years. In practice, plans indicated by farmers' surveys are generally implemented on a smaller scale and over a longer time. According to the autumn 2002 survey, 40% of farmers planned to invest during the next five years. Over half of investment plans were focused on new construction, a third on renovations of old buildings and nearly a fifth on extensions. Machine halls and dryers again remained the focus of a large proportion of investment plans. Modernisations and extensions of pig units as well as repairs of other animal husbandry

Table 23. Agricultural construction investments in the period 1998-2002 according to a survey of farmers in the AB support area. (Food and Farm Facts Ltd).

Investments % share	New buildings	Renova- tions	Extensions	Investments total
Conventional stalls/ open cowhouses	5	13	20	11
Cattlehouses	3	7	7	5
Pig units	5	15	15	11
Henhouses	2	4	4	3
Other animal husbandry buildings	3	6	0	4
Grain dryers	18	30	41	26
Machine halls	64	25	14	40
Total, %	100	100	100	100
Of all investments, %	44	41	15	100
Number of investments	6 800	6 200	2 300	15 300

buildings were planned on many farms. There were significantly fewer of such investment plans, however, than the investments made for these purposes in the AB area five years previously.

The farmers' survey shows that livestock farmers in the AB support area consider that nationally payable income supports, such as income support for milk and per-animal supports, are highly important in terms of decisions relating to the scope of production. Around 70% of dairy and other cattle farms, more than 80% of pig farms and 65% of poultry farms consider that animal husbandry income supports influence decisions relating to the scope of production very much or fairly much. The significance of aid solutions increases as the size of the farm increases. It is natural that farms which are planning to give up livestock production do not consider income support to have great significance in decisions relating to the scope of production.

Farmers who had made or were planning livestock building investments were asked about the significance of the present level of national animal husbandry income support and investment aid in terms of implementing investments. According to the survey, most of the farmers in the AB support area consider both forms of support to be significant in terms of implementing investments. Over 70% of cattle farms, around 85% of pig farms and 75% of poultry farms considered animal husbandry income support to be very highly or highly significant. Similarly, around 70% of cattle farms, 72% of pig farms and 43% of poultry farms considered investment aid to be very highly or highly significant. The significance of income support and investment aid increased as the size of farm increased.

The temporary nature of national animal husbandry aids for Southern Finland has affected farmers' decisions relating to production and its scope on around 55% of pig farms and more than 40% on other livestock farms. The temporary nature of the aids has had more of an impact on larger rather than smaller farms. Many farmers, however, trust in the continuity of aid solutions and their opportunities for production.

4.3.3 Profitability of investments

As a result of relatively low internal financing and poor profitability, farmers' opportunities to invest with their own internal financing are limited. Without income and investment supports, a large proportion of investments would not be implemented. The rapid structural development that has taken place during EU membership could have gone out of control without aid solutions that safeguarded production conditions over the longer term. The solutions in the southern parts of the country have been for fixed periods of time but, as the farmers' survey examined above made clear, some of the farmers who invest in production have the desire and need to continue their occupations as farmers by developing their farms despite the threats overshadowing the economy. Investment aids have served to reduce farmers' risks and they have been highly significant in encouraging building investments and other

investments relating to the farm development. On the other hand, relatively high investment aids can also tempt farmers into taking too high a risk and into unprofitable investments, consequently weakening the liquidity of farms.

In evaluating the profitability of investments, an investment is generally considered to be profitable if future returns, discounted to present values, exceed the investment cost. Taking uncertainty into account raises the required return on investment, however. In their study of the profitability of livestock farm building investments, Pietola et al. (1998) have found that taking into account unforeseen variation in prices using the real option method nearly doubles the required return on investment compared with the real capital costs. Unforeseen price variation connected with livestock production is generally less than 10% of producer prices but, in terms of the gross margin generated per animal place, the unforeseen variation is a third of returns.

The Pietola et al. (1998) research calculated the unforeseen price risk taking into account profitability calculations for livestock farm models of different sizes. The calculations used the price and cost levels at the time in question, taking into account the income and investment aids corresponding to the AB support area. Heikkilä & Uusitalo (2003) have updated the calculations for beef farming at the 2002 price level. In 2002, the investment in a cowshed for 64 animals was slightly profitable, if all aids are available. Without income support, the profitability threshold is not reached even in a larger farm model of 128 cows.

In beef production a calculation has been done for a rearing unit of 100 and 200 beef cattle. In 2002 the profitability condition for the investment was not reached in the 100-bull unit, but an investment in a 200-bull unit was slightly profitable, if all supports and investment assistance were received.

In piglet production units (65, 130, 260 sow places) the profitability condition for investment was fulfilled only in the 260 sow unit. Without income support the profitability condition for investment is not fulfilled in pig units of any size. The profitability of fattening pig farms was examined for farm-size categories of 400, 800 and 1,600 pigs. At the price and cost levels for 2000, the profitability threshold for fattening pig unit investments was not reached in any of these size categories.

MTT Economic Research studies into the profitability of farms which have invested, specifically dairy and pig farms that have received funding support and FADN bookkeeping farms which have made dairy farm investments, indicate that agricultural extension investments increase profitability most on farms that previously had poor profitability (Lajunen 2002, Heikkilä & Remes 2002, Knuutila 2002). Such farms are always in greater danger of a liquidity crisis than farms which are already profitable. When farms which had invested were classified into four groups according their profitability in 1996, profitability increased most in the weakest farm group. On farms that were most profitable, profitability faltered slightly

in the first two years and only rose to the level of the starting year at the end of the period under review, partly as a result of better production conditions in 2002. Although after the extensions, the number of cows in the farm groups compared was nearly the same at the end of the review period, there was still a difference in their profitability of around 40% in favour of the farm group that was most profitable at the beginning.

4.4 Impact of the structural change in agriculture on farm structure

4.4.1 Opportunities for structural change

In cost-effective livestock and crop production, fields should be close to the farmstead, but even in southernmost Finland individual farms are traditionally surrounded by forests. In addition, rocks, lakes and rivers increase travelling distances inside and outside farms. Through history, farmers have tried to create fields by clearing land best suited for cultivation, and in the southern and western parts of the country relatively extensive continuous field areas have arisen. The AB support area contains Finland's best production areas, in which arable land accounts for up to a quarter or more of the total land area . On the other hand, particularly in eastern parts of the AB area, there are more rugged regions, where the proportion of arable land is only a few per cent of the land area (Figure 26).

Improving the structure of agriculture by increasing farm size has led to a growth in demand for additional arable land, which in turn is reflected through time in a change in the price level for arable land (Pyykkönen 2002). The price of arable land is highest in the best production areas in the southern parts of the country, where demand is also highest. Prices of arable land fell at the beginning of the 1990s in the whole of Finland, but at the end of the decade the price level began to rise in the southern and western parts of the country. In eastern and northern parts of the country, demand for additional land is lower and the price level has remained almost as before.

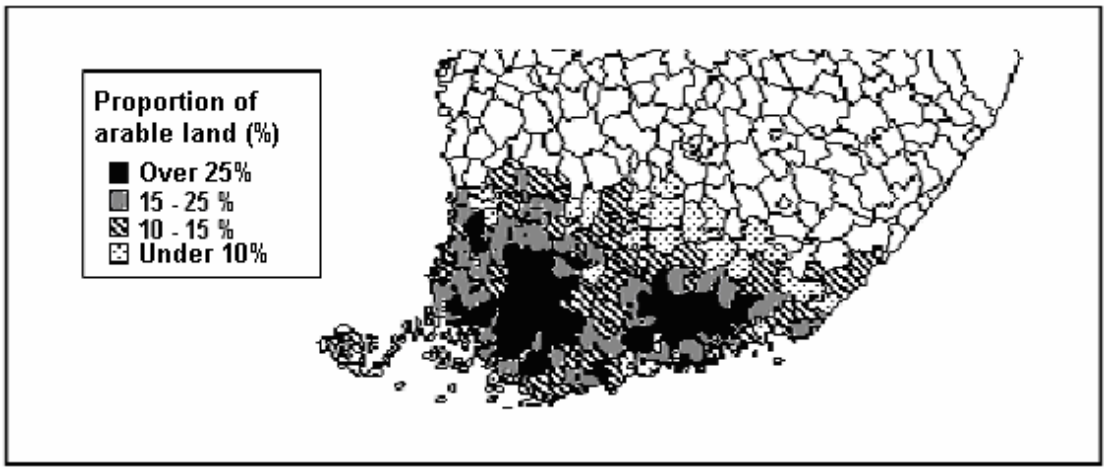

Figure 26. Proportion of total land area (%) accounted for by arable land in the municipalities of southern parts of Finland. (Pyykkönen 2002).

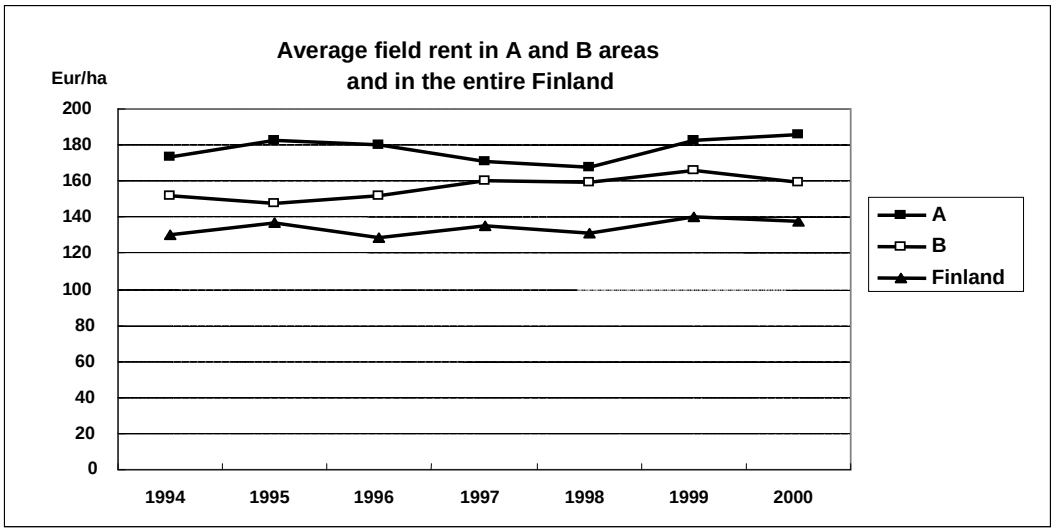

Figure 27. Average field rent (euros/ha) in the AB support area and in the entire country in the 1990s. (Pyykkönen 2002).

Most of the growth in the field area of farms has taken place through the renting of fields. In the period 1995-2001, the proportion of the AB area's arable land accounted for by rented fields grew from 22.7% to 31.3%. The development of field rents has been modest, partly due to the fact that the fields available for rent are often poorer in terms of farm structure and further away than active farmers' own fields (Figure 27).

4.4.2 The impact of growth in farm size on farm structure

The land parcels available as additional arable area are, in terms of the mechanisation of the expanding farm, often small and distant from the farmstead, in which case their cultivation is inefficient and the expansion does not generate the desired economies of scale. In studies of farm structure, Myyrä (2000) has found that greater financial losses result from small and poorly shaped land parcels than from the longer travelling distances. The small size of a land parcel does not only increase the work input per unit area; it also restricts the farmer's technology choices. On Finnish FADN bookkeeping farms, the size of the basic land parcel varies in different parts of the country. Land parcels of less than one hectare accounted for 35% of all bookkeeping farm land parcels in 1999, but their total area, however, was less than 7% of the land area. The average size of basic land parcels on Finnish FADN bookkeeping farms was 2.66 ha.

Myyrä (2003) has examined the difference in fertility between own and rented land on the basis of FADN bookkeeping farm land parcel data and has found that rented land is poorer in terms of its fertility. The crop output capacity of rented land is not, however, significantly behind the crop output capacity of fields owned by the farmer. In a study under way into the finances of basic improvements and land fertility, Myyrä states that incentives to maintain the fertility of rented land have weakened significantly.

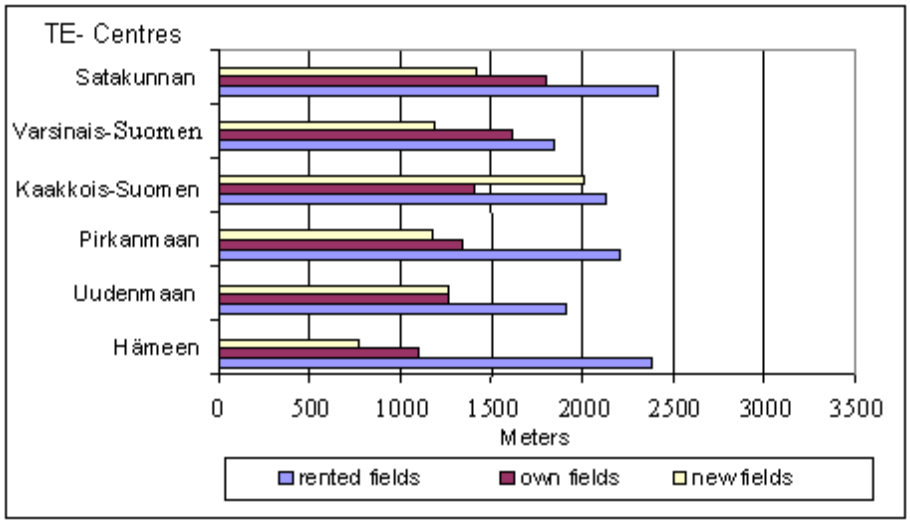

Figure 28. The average distance of basic land parcels from the farmstead in the area of Employment and Business Development Centres (TE-Centres) corresponding to the AB support area in 1999. (Myyrä 2000, Tike, land parcel register).

The formation of new land parcels through arable land purchases and by combining parcels has reduced the distance problem caused by farm structure, but the rental of fields has, on the other hand, increased the problem everywhere in Southern Finland (Figure 28). The distance problem also affects the functioning of the arable land market. When renting a field, a farmer does not need to commit himself to the distance problem as is the case when buying additional land. Examined by production sector, pig farms obtain rented land furthest away (on average 4.9 km), cereal farms next furthest (3.2 km) and dairy farms closer (2.8 km). On dairy farms there is an emphasis on the closeness of fields necessary for the production of roughage and grazing.

4.5 The development of agricultural productivity

In agriculture the improvement of productivity is considered to be one of the key objectives. Productivity is the ratio of production output and the inputs used to achieve it. The inputs used in production activity are labour, capital, energy, materials and expertise. In an examination of productivity, the total amount of production is divided by all of the inputs used to achieve it to obtain the total productivity. Total productivity describes the internal efficiency of production activity. Productivity is not influenced by changes in unit prices. On the company level, productivity describes the performance of a company in changing inputs into production outputs (Rantanen 1992, cf. Myyrä 2002).

Myyrä & Pietola (1999) have determined the productivity development of Finnish agriculture on a national level from an overall calculation of agriculture and by using so-called Divisia indices based on FADN bookkeeping farm data. In the early 1990s, productivity development was very slow due to the production restrictions that prevailed at that time. Moreover, uncertainty about future agricultural policy and producer prices postponed invest-

ment decisions and weakened the development of productivity. The results show that the productivity development of Finnish agriculture has been clearly slower than in the leading agricultural countries of Northern Europe.

In the period 1995-2000, agricultural productivity rose in Finland by an average of 1.1% per year. The productivity development means that in 2000 around 5.7% higher output was obtained than in 1995 with the same amount of inputs (Myyrä & Pietola 2002). Agricultural labour has been replaced to a great extent by capital. Total agricultural labour is measured in calculated working time per year of a fully employed person, i.e. in Annual Work Units. In the period 1995-2000, total agricultural labour decreased from 140,000 units to 108,500 units, i.e. by 22.5%. On the other hand, average agricultural labour per farm only decreased by around 5%. Increases in agricultural capital have not led in Finland to a similar development in productivity as in the countries of Central Europe.

Due to difficult natural conditions, an increase in mechanisation and other technology in Finland does not achieve a similar increase in efficiency as in countries where better production conditions exist. The short growing season and long inside feeding season in animal husbandry mean that more efficient production technology is needed in Finland compared with Central Europe, and it is used relatively less due to the seasonal nature of working tasks. In addition to a natural disadvantage, agricultural entrepreneurs in Finland encounter other cultivation problems such as the disadvantage resulting from farm structure examined in section 4.4.2.

The productivity development of agriculture as a whole, however, has been faster on average than productivity development of individual production sectors. This is due to a rise in productivity achieved through structural development. As a result of structural development, farms with high production costs have disappeared from agriculture and their production has transferred to lower production cost farms that are continuing the production. The productivity development of agriculture has been examined in the form of three-year moving averages using estimated figures based on FADN bookkeeping farms in different production sectors. Productivity development in the whole country, examined by production sector in the period 1995-2000, has been as follows (%/year):

Dairy farms	0.81
Other cattle farms	0.47
Pig farms	-0.29
Cereal farms	-4.92

In the early years of EU membership, the productivity development of pig and cereal farms was faster than that of dairy farms, but in 1999 and 2000 productivity development of pig and cereal farm declined sharply. The productivity of dairy farms has increased, although slowly, during the entire period under review. Thus the average productivity development of dairy farms in the period 1995-2000 was better than in other production sectors (Figure 29). Through the liberalisation of trade in milk quotas, farms have been able to exploit the production potential provided by a rise in the average yields of cows. Beef production in Finland occurs mainly with dairy breed animals. There is no significant beef production based on suckler cows in Finland, however. The number of suckler cows in 2000 was around 28,100 animals (including heifers, around 34,220), and this represents around 8% of cow numbers (Tike). Due to the small number of beef farms, the enclosed productivity development based on FADN farm material is less precise than the productivity development estimated for dairy farms and pig farms.

Despite the clear advantages of large-scale production observed in pig farming, the rapid growth in farm size has not yet led to a rise in productivity. According to Myyrä & Pietola (2002), this may be due to growth and adjustment costs encountered by pig farms. Production volumes have been raised quickly, but production has not yet achieved the best possible efficiency. The new technology of large-scale production units has been introduced on pig farms, but on many farms the comprehensive renewal and integration of production systems are still under way.

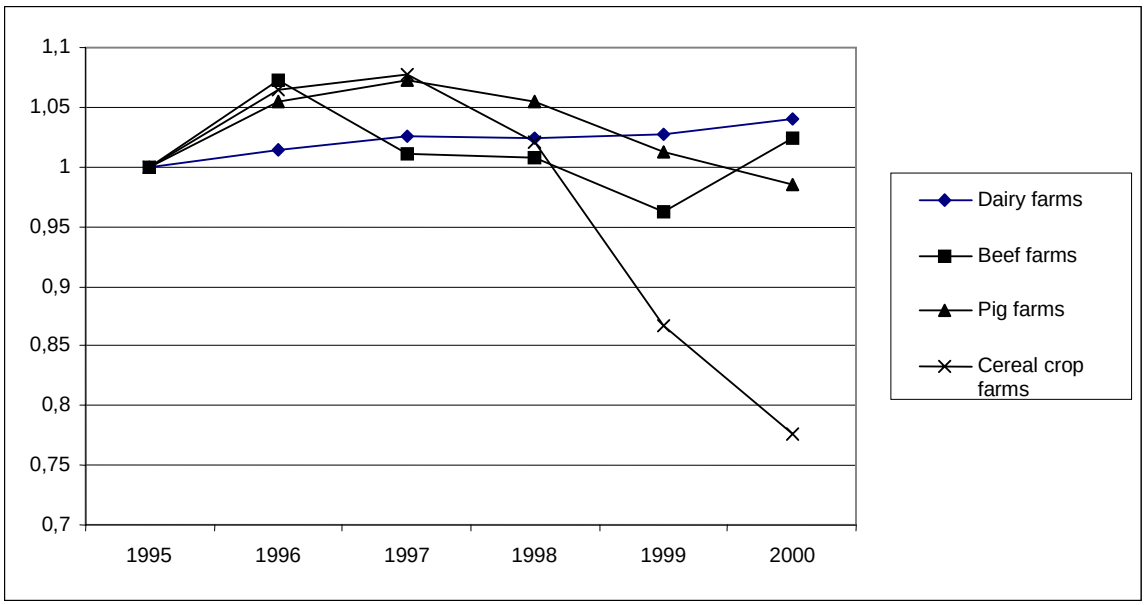

Figure 29. Agricultural productivity development by production sector in Finland in the period 1995-2000. (Ratios, 1995=1.0). (Myyrä & Pietola 2002).

The productivity of cereal farms fell sharply at the end of the 1990s, because the years 1998 and 1999 were very poor in terms of weather conditions in the main cereal production areas. In the period 1995-2000, the productivity of cereal farms fell in Finland by an average of 4.9% per year. On the other hand, 2000 was better as far as production conditions for cereals were concerned, but because productivity development is based on a three-year moving average, changes in it take place more slowly than an annual study would reveal.

Recent productivity of Finnish agriculture has been low compared with studies made in some OECD countries, which show that productivity development over longer time periods (1970-1987; 1962-1990) has been 2-3.1% in Sweden, 4.3-4.6% in Germany and 3.7-4.1% in Denmark as well as 3.7-4.0% in Belgium, 2.5-3.6% in England and 3.9-4.4% in France (Barnard & Jones 1993, Trueblood 1996, cf. Oskam & Stefanou 1997).

5 The development of agricultural and horticultural revenue, costs, income and profitability in the AB support area

5.1 Description of financial results, data and financial concepts

The financial results of agriculture and horticulture have been examined below from the perspective of profitability in order to be able to make conclusions about the effects of national aid for Southern Finland on the financial preconditions for the practice of agriculture and horticulture on average and in different farm-size categories. Integration into the EU's agricultural policy requires from agriculture sufficient profitability so that farms can operate long term, make replacement investments and possible expansions, receive reasonable compensation for the work of a farming family and ensure a sufficient number of generation changes to safeguard the continuity of the industry.

In the new financial operating environment brought by EU membership, a large number of small farms have given up production, unable to meet the demands of the operating environment. The production resources released from small farms have to a great extent been transferred as additional resources to farms that are continuing their production. Improved profitability is sought through structural development. In order to operate effectively in the industry, the prerequisites for profitable production must exist. If even the largest and most efficient farms do not succeed in making their production profitable, the industry will lack the financial preconditions for operating and a decline in production will be threatened. In Finnish agriculture, natural disadvantage and small farm size represent an additional cost which must be compensated by aid, so that Finnish agriculture can operate in the environment of the common agricultural policy within the internal market with other EU Member States.

Thus the profitability of production is the criterion by which the financial preconditions for business activity in terms of integration into the EU's agricultural policy can be assessed. Profitability encompasses the need for compensation resulting from natural disadvantage, the high costs arising from small farm size and other financial factors that adversely affect equal competition.

Profitability is measured, then, using the concept of entrepreneurial profit or profitability coefficient as a typical ratio, with most of the factors included in it being determined objectively through bookkeeping. Only the calculated compensation to be assigned for the farming family's own work and for the capital invested into the agriculture is a partially subjective item. Based on work bookkeeping, and assessed on the basis of alternative cost, the farming family's work and capital compensation requirement can also be seen as an objectively assessed and externally given item. Profitable primary production ensures the operating preconditions for the entire food chain, in addition to which agriculture and horticulture have wide-ranging effects also on the viability of rural areas, different sectors of society and, ultimately, the well-being of consumers.

5.1.1 Describing results and data

The financial results of agriculture and horticulture are examined below in the main production sectors on the basis of FADN bookkeeping farm data. In the smaller production sectors, where the number of FADN farms is insufficient, the account is based on the Enterprise and Income Statistics of Agriculture (MYTT). The latter are statistics maintained by Statistics Finland based on agricultural taxation data. The account of the results uses the financial concepts of the FADN bookkeeping system, supplemented by Finnish profitability bookkeeping concepts. MYTT financial concepts are cash based. MYTT data can be used to examine farm income but not profitability.

FADN farm data covers a total of 900 farms and they describe agriculture more in terms of main activity than MYTT. The MYTT farm sample is some 9,000 farms. It covers all farms of more than two field hectares which receive income from agriculture and which are owned by natural persons. Finland's FADN farm system includes farms of more than 8 ESUs, so on these farms agriculture is practised as a main activity more than e.g. on the average active farm. This means that in the FADN system the 8-12 ESU farm-size category includes 30 hectare cereal farms, but the smallest milk production farms, which have around 10 cows, are placed in the 12-16 ESU farm-size category.

A comprehensive adjustment to the valuation of working capital covering all farms was made in the Finnish FADN data in 1998 and the method of calculating depreciation was changed. At that time the application of depreciation under agricultural taxation was transferred to depreciation according to plan under the FADN system, which on many farms increased the amount of depreciation. The calculation of standard gross margins, which are the

basis of economic farm size, was adjusted in the late 1990s. Because in Finnish agriculture results fluctuate strongly due to weather conditions, conclusions about agricultural results can be made only on the basis of several years' results.

The development of farm income and profitability is examined below in long time series from the period 1992-2000, including the years immediately preceding EU membership. In addition, a forecast for the period 2001-2003 has been made, based on the results for 2000. In this, the amount of inputs and outputs are the same as in 2000, but prices and aids have been changed for the years of the forecast using indices. Because the standard gross margins, which are based on the classification of data in the FADN system, are renewed every few years, this can be a cause of uncertainty in long time series. In long times series an inflation correction is made using the cost-of-living index. In the period 1995-2003 the cost-of-living index rose 12.5%. Thus the figures presented below are real, if not otherwise stated.

In addition to farms' average income and profitability development, section 5.2 examines the effect of farm size on the financial performance of agriculture. At the same time, attention has been paid to the significance of income supports granted under Article 141 and other income supports in the income formation and profitability of agriculture. An account according to farm size of the main production sectors has been given where there are sufficient FADN farms. Moreover, production costs of a litre of milk and a tonne of cereal, and a farm distribution according to these, have been examined for dairy and cereal farms. In terms of the main production sectors, the account is based on the results of FADN farms and, in terms of the smaller production sectors, on accounts and separate calculations according to MYTT. Result figures are presented in Appendix 6.

5.1.2 Financial concepts

The total revenue of agriculture includes income received from the sale of products, including the value of the farming family's own consumption, as well as supports wholly or partly funded by the EU (Appendix 1) and national aids. *Production cost* includes the cost of goods and supplies, depreciation, salaries paid, interest on debts, rental payments for fields and production equipment etc., general costs as well as the farming family's work and capital income requirement. An account of agricultural profitability investigates the amount of compensation that has been obtained for all costs arising from production, in other words how well the total revenue covers all the costs devoted to achieve production. If total revenue is greater than the production costs, the farm has made an entrepreneurial profit. If, on the other hand, total revenue is smaller than cost, the farm has made an entrepreneurial loss.

Entrepreneurial profit and loss describe the profitability of a farm in euros. In Finnish profitability bookkeeping the entrepreneurial profit/loss concept has been described using a ratio called the *profitability coefficient*. If a farm has made a profit, the profitability coefficient is greater than 1.00, if the total revenue and production cost are equal the profitability coefficient is 1.00, and if a farm has made a loss the profitability coefficient is less than 1.00.

Because on Finnish farms the use of hired labour is low, excluding the largest farms and greenhouse production, the concept of family farm income is used more than farm net value added as a financial concept in examinations of agricultural results. Family farm income is the compensation received by the farming family for its own work and for the capital it has invested in the farm. Farm net value added also includes, in addition to family farm income, compensation for hired labour, interest on outside capital and rental expenses. Agricultural profitability is examined below by studying how well family farm income has covered the farming family's wage and capital income requirement. An examination of profitability based on family farm income deducts the farming family's wage and capital income requirement to give the entrepreneurial profit or loss mentioned above.

The farming family's wage requirement is calculated on the basis of hours worked in agriculture. Finnish bookkeeping farms use hourly based bookkeeping of working hours. The farming family's working hours have been priced using a wage requirement corresponding to the average hourly earnings of an agricultural worker, which were 7.57 euros/hour in 2000. The farming family's wage requirement applied in bookkeeping is low if it is compared, for example, with the average hourly earnings of industrial workers, which were 15.11 euros/hour in 2000. As the farming family's required return on its own capital has been used a 5% interest rate, which has long been applied in profitability book-keeping and is justified by the yield on long-term deposits.

Results according to the above financial concepts could be calculated only on the basis of FADN farm data. From MYTT statistics based on taxation data could be calculated only a cash-based concept corresponding mainly to family farm income. A more detailed presentation of financial concepts and their formation is given in Appendix 3.

5.2 Agricultural results in different production sectors

5.2.1 Dairy farms

Average profit development

The income and profitability development of dairy farms in the AB support area is examined below with the aid of FADN farm results for the period 1992-2003, although the main focus is on profit development during the time of EU membership. The FADN farm results have been weighted to describe the average results of AB area dairy farms in the years under review (Appendix 6 Figure 1a).

The total revenue of AB support area dairy farms fell due to EU membership by an average of 13% from the level immediately preceding membership, and grew by around 40% in the period 1995-2003e. Growth in total revenue per farm has been achieved through growth in farm size, because producer prices have remained relatively as before and aids per farm have

declined. The proportion of total revenue accounted for by national aid and EU aids has fallen slightly and in 2000 it was 33%. In the period 1995-2000, dairy farm field hectares increased by 10.6 ha/farm (40%) and livestock units by 5.8 lu/farm (27%). In 2000 the size of dairy farms was 36.9 hectares of field area and 28.0 livestock units/farm (of which 18.5 milking cows). Total revenue calculated per field hectare or livestock unit on dairy farms in the period 1995-2003e has not changed at all. Production cost per field hectare, however, has fallen by 5%, but per animal has remained nearly the same. Thus the growth in average farm size has not changed the real results of dairy farms.

In dairy farm production costs the item that has increased most is depreciation, which has doubled in the period 1995-2000. On FADN farms the amount of depreciation grew slightly in 1998 due to a change in its calculation method, but most of the increase in depreciation cost has arisen from an increase in investments. In 2003 depreciation accounted for 15% of costs. In spite of structural development, milk production remains a labour-intensive activity. On most dairy farms the farmer and his/her spouse are responsible themselves for farm work and, mainly for cost reasons, little external labour is used. Wage expenses and interest and rental expenses on outside capital represent 5% of production cost. On dairy farms the proportion of production cost accounted for by the farming family's wage requirement and interest requirement on own capital invested in the farm was 48% at the beginning of the 1990s and 43% in 2000.

The total revenue of dairy farms covered around 75% of production costs in the period 1995-99 and around 80% in the period 2000-2003e. Thus dairy farms recorded a loss amounting to 20-25% of costs. The profitability coefficient of dairy farms varied between 0.49 and 0.57 in the period 1995-2003e. Family farm income covered around half of the wage and capital income requirement, i.e. in 2003e the farming family received around 4 euros/hour wage compensation and an average return on their own capital invested of 2.7% (Appendix 6 Figure 1b).

National aid has a very great significance for the dairy farms of the AB support area, because it covered around half of family farm income in the period 1997-99 and 42% in the period 2000-2003e. In the following account, family farm income has been presented per farm. Due to the low profitability of agriculture, it has been possible to safeguard the continuity of production on dairy farms in Southern Finland through national aid. Without national aid, family farm income would have accounted for only 33% of a farming family's wage and capital income target, which means that in 2000 the hourly pay of a farmer and his/her spouse (1.9 people/farm) was 2.5 euros and interest on own capital 1.6%. Thus the low profitability provides no motivation to entrepreneurial activity and it does not allow the development of production. Even on debt-free farms, such a low income level and profitability cause liquidity problems and, should they continue, serious financial problems for the entire production sector.

	1997-99	2000	2001e	2002e	2003e
Family farm income, euro/farm	22 113	25 431	26 220	27 397	26 602
National aid, euro/farm	11 429	10 861	11 375	11 724	11 252
of family farm income, %	52	43	43	43	42

Profitability development in different farm-size categories

The financial results of dairy farms according to farm size can be examined using the FADN farms in the AB support area only in two farm-size categories that have sufficient FADN sample farms as a basis for examination. Dairy farm production has been loss-making in both farm-size categories, with the entrepreneurial loss per farm being slightly smaller on larger farms. In the period 1995-2000, the profitability coefficient of production has fallen on 16-40 ESU dairy farms from 0.57 to 0.51 and on 40-100 ESU dairy farms it has risen from 0.61 to 0.68. National aid accounts for 40% of family farm income in both farm-size categories. Thus the long-term continuation of production without national aid is not possible even on the largest dairy farms.

Distribution of dairy farms according to production costs

The distribution of dairy farms according to unit costs has also been examined (Riepponen 2003). When FADN dairy farms in the AB area were grouped in ascending order according to production costs per tonne of milk, it was found that the market return on milk did not cover the production costs of milk in any farm group (decile grouping). On around half of the farms it covered variable costs. These are farms in the 22-32 cow category. The market price and income support together covered variable costs on 70% of dairy farms, but only the entire production costs on 20%.

The milk production cost distribution curve is a gentle one, i.e. production cost varies in a fairly small range; on 60% of farms it is 420-530 euros/milk tonne and on 80% of farms 400-570 euros/tonne. Thus even minor changes in producer prices and aids lower the number of unprofitable farms and increase the number of those farms which, excluding aids, are not even able to cover variable costs. (Riepponen 2003).

5.2.2 Other cattle farms

Average profit development

On beef production farms, the total farm revenue fell by a fifth due to EU membership from the level that immediately preceded it and returned nearly to its former level only through structural development and the Agenda 2000 aid solutions. The years 1998 and 1999, in which production conditions were poor, lowered the output of beef farms. In the period 1995-2000, the average farm size of beef farms grew by a fifth. In 2000 the farm size was 46.3 hectares and 46 livestock units/farm. In the period 1995-2003e, the proportion of total revenue accounted for by income supports grew from 45% to 54% (Appendix 6 Figure 2a).

The profitability of beef farms in the period 1995-1999 was very weak; family farm income covered only 40% of a farming family's wage and capital income requirement. Through the Agenda 2000 solutions and strong structural development, the profitability coefficient rose from 0.39 to 0.72 (Appendix 6 Figure 2b). The examination of beef production results is based on quite limited FADN farm data, so the variability of sample farms in the data may indicate unevenly the progress of structural development.

The proportion of family farm income accounted for by national aid has declined, mainly due to a growth in family farm income. The forecast for 2003 indicates a fall in family farm income, however. National aid covers 66% of family farm income. Such aid therefore is highly significant for the practice of this production sector in the AB area. Given the low profitability of beef farms, without national aid the profitability coefficient would crash to 0.25, in which case no real basis for the practice of this production sector would exist.

	1997-99	2000	2001e	2002e	2003e
Family farm income, euro/farm	15 900	23 300	25 000	25 700	24 900
National aid, euro/farm	16 900	16 100	17 100	17 100	16 500
of family farm income, %	106	69	68	67	66

Beef production has suffered from weak profitability of production, as a consequence of which 37% of the 55,041 suckler cow and heifer premium quota granted to Finland by the EU is unused. Beef production is strongly linked to milk production, because only around 8% of Finland's cows are in suckler cow production. The worst threats to the expansion of suckler cow production are considered to be a lowering of unit subsidies, a weakening of profitability and a discontinuation of incentives (Heikkilä et al. 2003).

5.2.3 Pig farms

Average profit development

The profit development of pig farms includes both fattening pig farms and piglet production farms (Appendix 6, Figure 3a). Their total revenue in the period 1995-1999 was more than 10% lower than in 2000. A rise in the market prices of pigmeat has influenced total revenue, because the proportion of total revenue accounted for by market returns has grown from 69% to 74%. The proportion of aids has correspondingly declined. The cereal area on pig farms has increased by only a few hectares, while at the same time the group of pig farms in the FADN data under examination has become more dominated by piglet production.

The production cost of pig farms has varied in the period 1995-2003e from around 166,600 euros to 188,900 euros. The cost of goods and supplies, the acquisition of animals etc. and similar costs amounted to 60%, depreciation 15% and salary expenses, rents and interest on outside capital 5% of total production cost. As the farming family's wage and capital income

requirement is only around 20% of production cost, even relatively small changes in revenue and production costs have a major impact on family farm income and profitability. In the period 1997-1999, pig farm production was loss-making and the profitability coefficient was 0.80. In 2000, the family farm income received on pig farms corresponded to the farming family's wage and capital income requirement (7.57 euro/h and 5% interest). In 2001e, the profitability coefficient of pig farms was 1.3, after which it began to fall (Appendix 6, Figure 3b).

Although national aid accounts for only around 14% of total revenue on pig farms, it has a major impact on the formation of family farm income. In the period 1997-1999, national aid covered the whole of family farm income, and also in the period 2000-2003e the proportion of national aid has been 55-77% family farm income. On pig farms, aids also have a stabilising significance on income and profitability. As the proportion of the farming family's wage and capital income is small on pig farms, even minor changes in the level of prices, cost and aids can cause big changes in family farm income and profitability. The proportion of family farm income on pig farms accounted for by national aid is described by the following figures:

	1997-99	2000	2001e	2002e	2003e
Family farm income, euro/farm	28 600	37 800	49 900	42 300	40 800
National aid, euro/farm	32 200	29 000	27 200	25 900	24 700
of family farm income, %	113	77	55	61	61

Profitability development in different farm-size categories

It has been possible to examine pig farm results using FADN farms in three different farm-size categories. In the smallest, 16-40 ESU, farm category, the profitability results are from 1995 and 1997, in which case their profitability rose from 0.55 to 0.59. On 40-100 ESU farms, profitability has been clearly better than in the smallest farm-size category. The results of farms of more than 100 ESUs from 1997 and 2000 show that a rise in profitability along with farm size is not self-evident. In the over 100 ESU farm category there are many farms which have invested heavily in expanding production. Pig farms are introducing the new technology of large-scale production units but, as was stated in section 4.3.3, profitability can falter for a few years after investments as a result of adjustment costs. This in turn causes fluctuations in the profitability coefficient, particularly with the largest farms.

	16-40 ESU	40-100 ESU	100- ESU
1995	0.55	0.67	...
1997	0.59	1.02	1.54
2000	…	1.14	1.04

In 2000, the proportion of family farm income on pig farms accounted for by national aid was 64% on 40-100 ESU farms and 113%, i.e. greater than family farm income, on farms of more than 100 ESUs. National aid has therefore been an essential precondition of profitable production also on the largest pig farms.

5.2.4 Poultry and sheep farms

The results of poultry and sheep farms are based on taxation data (MYTT), on the basis of which it has been possible to calculate the cash-based agricultural income obtained as compensation for the farming family's work and own capital. The content of the financial concepts does not correspond to the concepts of the FADN scheme, but the MYTT concepts are suitable for describing income development. Profitability cannot be examined on the basis of MYTT data.

Egg production farms

On egg production farms, total revenue was a third lower in the period 1995-1999 than in 2000-2003e (Appendix 6 Figure 4). In the period 1995-2003e, aids have accounted for around a third of total revenue on egg production farms. The development of total revenue has been affected by the strong structural development of egg production. The size of egg farms was 2,400-3,700 hens per farm in the period 1995-1998 and more than 5,500 hens per farm in 1999-2003e. Thus total revenue per livestock unit declined by 5% and family farm income by 30% from 1997-1999 to 2000. In 2003e total revenue was 23,800 euros/1,000 hens and family farm income 2,670 euros/1,000 hens.

The development of total revenue in egg production has also been affected by the trend in egg prices. The price of eggs rose in 1999 as a result of production limitation agreements between producers, but in 1999 the price fell by 15% and then rose slightly. The cash-based family farm income of egg farms has in most years averaged 20,000 euros, but the fall in prices in 2001 reduced family farm income nearly to zero. The importance of national aid in the egg production sector is illustrated by the fact that in the period 1997-1999 national aid was around 20% greater than cash-based family farm income, in 2000 aid was 95% of family farm income, in 2001 aid was 1.76 times the level of family farm income and in 2002-2003 it is estimated to be around 20% greater than family farm income.

Poultrymeat farms

Poultrymeat farms are mainly broiler farms. In 1995-1996 their total revenue was around 350,000 euros per farm after a reduction of approximately 20% (Appendix 6 Figure 5). Cash-based family farm income accounted for around 15% of total revenue in the period 1997-2003e. The number of broilers on farms increased by around 27% in the period 1997-2000 to stand at 29,300 broilers in 2000. Thus total revenue per livestock unit declined by 15% and family farm income by 26%. In 2003e total revenue was 12,300 euros/1,000 broilers and

family farm income 1,520 euros/1,000 broilers. The proportion of the cash-based family farm income of broiler farms accounted for by national aid was 92% in 1995-1996, and national aid was 8-19% greater than family farm income in the period 1997-2003e.

Average profit development of sheep farms

In the period 1997-1999 the total revenue of sheep farms fluctuated between 12,000 and 18,000 euros. In the period 2000-2003e it has been around 14,000 euros/farm, of which national aid accounted for 20% and EU aids 45%. In the period 1997-2003e, the proportion of cash-based family farm income from total revenue has fluctuated in sheep farming from nearly zero in 1999 to around 15% in most years. The great significance of national aid in sheep farming is illustrated by the fact that aid was greater than agricultural income throughout the entire review period; in 1997-1998 it was more than double the level of cash-based family farm income, in 1999 it covered nearly 90% of production cost in addition to family farm income, in 2000-2001e it was greater than family farm income by a factor of 1.7 and the forecast for 2002-2003 indicates that aid was slightly greater than family farm income.

5.2.5 Crop production farms

5.2.5.1 Cereal farms

Average profit development

The average profit development of cereal farms is based on FADN farm results (Appendix 6, Figure 6a). Their total revenue in the period 1995-1999 was around 7% lower than in 2000, because in 1998-1999 the cereal crops were exceptionally poor due to weather conditions. In 1995-1996, aids accounted for 50% of total revenue, which has clearly also had a stabilising effect on the development of cereal farm total revenue in weak years. Most of the aid is EU aid. National aid accounted for around 12% of total revenue in 1995, after which it declined to a figure of 7% in 2003e. Cereal prices have fallen in the same period, so in cereal production it has only been possible to maintain the level of total revenue by increasing farm size, because cereal yields have not increased at all during the period under review (section 3.1.2). The average size of FADN cereal farms has grown in the period 1995-2000 from 49.5 ha to 54.8 ha, i.e. by around 11%. At the same time the real total revenue of cereal farms per field hectare has declined by 8% in the period 1995-2003e.

The production cost of cereal farms has fluctuated in the period 1995-2003e mainly due to production conditions. Production cost per hectare of field area rose in 1995/96-1997/99 by around 10% due to crop failure, and thereafter fell 12% by 2003e. Because the farming family's wage and capital income requirement is around 33% of production cost and half of total revenue is aid, the profitability of cereal farms is not very sensitive to price changes. Despite this, the crop failures of 1998-1999 lowered the cereal farms' profitability coefficient from

0.8 to less than 0.4. Cereal farms have also been loss-making after this and their profitability coefficient has been around 0.7 (Appendix 6, Figure 6 b).

In the period 1997-1999, national aid covered 78% of family farm income, which was lower due to weather conditions. The level of national aid on cereal farms in 1998-1999 was higher than in 2000 due to crop damage compensation (32-42% of national aid) and transition period aid. In the period 2000-2003e national aid accounted for 22-29% of family farm income on cereal farms. Given the loss-making nature of cereal farms, national aid is essential in safeguarding the preconditions for cereal production in Southern Finland, which is the heartland of cereal production in the country.

	1997-99	2000	2001e	2002e	2003e
Family farm income, euro/farm	8 300	15 600	14 500	14 700	14 400
National aid, euro/farm	6 500	3 400	3 800	4 200	4 200
of family farm income, %	78	22	26	29	29

Profitability development in different farm-size categories

The smallest cereal farms in Finland's FADN system are 8-16 ESUs. In the period 1995-2000 their profitability coefficient has fallen 0.54 from 0.23. Farms with such weak profitability have no opportunities to make replacement investments and to continue production long term on agricultural income. Many of these smaller cereal farms (around 30 ha) are cattle farms that have abandoned livestock production. On the other hand, profitability has improved on 16-40 ESU farms (around 45 ha) and 40-100 ESU farms (around 70 ha). There are no cereal farms of more than 100 ESUs among Finland's FADN farms. On cereal farms the profitability coefficient has increased clearly as farms have grown in size.

	8-16 ESU	16-40 ESU	40-100 ESU
1995	0.54	0.77	0.80
1997	0.33	0.84	1.07
2000	0.23	0.82	1.28

In 2000, the proportion of family farm income on cereal farms accounted for by national aid was 42% on the smallest farms, 22% on 16-40 ESU farms and 25% on the largest farms. Thus even the largest farms do not achieve profitable production without national aid, because its removal would reduce the profitability coefficient to 0.54 and would destroy incentives to expand and develop production in the cereal sector.

Distribution of cereal farms according to production costs

The grouping of cereal farms in ascending order according to production costs per tonne of cereal showed that market returns for cereals did not cover the production cost of cereals in any farm group (decile grouping). On around half of cereal farms it covered variable costs.

By decile group their average size ranged from 50 to 80 hectares. Market price and income support together covered variable costs on all cereal farms, but on only 20% did they clearly cover the whole of the production cost, and on 20% the production cost was the same as the subsidised market price.

The distribution curve of the production cost per tonne of cereal is quite steep in terms of the highest unit costs, because on the smallest cereal farms the production cost has been high. On 20% of farms the production cost has been nearly one half greater than the market price and income support and on 10% nearly double the subsidised market price. These are mainly small farms of less than 30 hectares. (Riepponen 2003).

5.2.5.2 Special crop production farms

The following account of the results of special crop production farms is based, for example, on the profit development of sugarbeet farms detailed in FADN farm data for the period 1992-2000. Farms have been taken from FADN data on the basis of cultivated area and their results are not weighted to correspond to the average for the entire AB area. The average size of sugarbeet farms has grown in the period 1995-2000 from 52.4 ha to 63.0 ha, i.e. by 20%. The total revenue of sugarbeet farms per field hectare has fluctuated annually from 2,160 euros to 2,480 euros. The corresponding annual fluctuation in hectare costs has been from 2,220 euros to 2,530 euros.

The proportion of total revenue accounted for by national aid declined from 13% to 10% in the period 1997-2000. The proportion of EU aids was correspondingly 17% to 22%. Market prices therefore have a significantly greater impact on the income formation of sugarbeet farms than is the case on cereal farms. The results of sugarbeet farms have been slightly loss-making during the entire period under review, with most losses being recorded in 1995 and in the 1998 and 1999, when weather conditions were poor. The profitability coefficient has fluctuated between 0.7 and 0.9 (Appendix 6 Figures 7a and 7b).

In the period 1995-1999, the proportion of the family farm income of sugarbeet farms accounted for by national aid rose from 57% to 66%, but in 2000 it fell to 48%. The poor profitability of farms and its annual fluctuations increase the significance of national aid. Over 90% of sugarbeet production is in the AB area, as a result of which national aid is very important not only for sugarbeet farms but for the whole sugar production sector in Finland.

5.2.6 Horticultural production farms

5.2.6.1 Open-field vegetable farms

The results of open-field vegetable farms have been examined with the aid of MYTT farm material based on taxation data for farms that produce stored vegetables and for farms that sell their products without storing them. The results are for the period 1997-2000 and they

are weighted to correspond to the entire AB support area. In the MYTT farm data, field size has increased on stored vegetable farms by only 4% since 1997, but on unstored vegetable farms by a third. In 2000 the average size of stored vegetable farms was 33 hectares and of unstored vegetable farms 23 hectares. In both farm groups, vegetable cultivation areas have remained unchanged, on stored vegetable farms 12 hectares and on unstored vegetable farms 5 hectares. The total revenue of open-field vegetable farms, however, has declined during the period under review by a fifth and per hectare of field area by a quarter as a result of poor weather conditions. The proportion of EU aids has grown from 11% to 18% of total revenue and the proportion of national aid has fallen from 9% to 5% of total revenue (Appendix 6 Figure 9).

In the production costs of open-field vegetable farms the emphasis is on the use of outside labour and on wage costs, whose share of production costs in 2000 was 9% of production cost on stored vegetable farms and 15% on unstored vegetable farms. In the period 1997-2000, wage costs declined on stored vegetable farms by around 40%, but on unstored vegetable farms they increased by a factor of 2.5. The total production cost per hectare of field area has declined on stored vegetable farms by 28% and on unstored vegetable farms by 12% in the period 1997-2000.

For stored vegetable farms, Agrifood Research Finland (MTT) has studied in winter 2002/03 the costs of vegetable storage on eight FADN farms of different sizes by means of farm visits and farmers' interviews. The vegetable cultivation area of the farms ranged from 5 to 40 hectares. The storage premises were equipped with temperature control systems, with the smallest farms having one vegetable store and the largest farms two vegetable stores. The storage cost on average was 61.20 euros/m^3. Work input accounted for more than half of the storage cost. The depreciation cost was 18%, interest, maintenance and insurance a total of 13%, electricity and heating 6% and goods and supplies 12%. National aid for a temperature-controlled vegetable store was 15.00 euros/m^3 in 2002 and 14.50 euros/m^3 in 2003. Therefore aid covered 24.5% of the vegetable storage cost in 2002 and 23.7% in 2003.

Family farm income has fallen by an average of 14% on open-field vegetable farms and by 23% on stored vegetable farms. Family farm income per hectare of field area has fallen correspondingly by 40% and 42%. On average, the proportion of family farm income accounted for by national aid on stored vegetable farms and on open-field vegetable farms is as follows:

	Stored vegetable farms, average				Open-field vegetable farms, average			
	1997	1998	1999	2000	1997	1998	1999	2000
Family farm income, euro/farm	26 400	27 600	25 300	22 800	19 500	20 700	17 800	15 100
National aid, euro/farm	10 400	6 700	5 400	6 600	8 000	5 300	4 000	3 900
of family farm income, %	39	24	21	29	41	26	22	26

National aid has great significance for all open-field vegetable production farms. Storage aid for its part lowers storage costs, which can be high in Finnish conditions, and improves the relatively low incomes of farming families. Although consumers favour domestic vegetables, competition means that farmers cannot price their products to obtain from the market a margin to cover high storage costs.

5.2.6.2 Greenhouse production farms

FADN farm results have been available for greenhouse production since 1996. Results have been weighted to correspond to the AB support area's entire greenhouse production (Appendix 6 Figures 8a and 8b). The total revenue of greenhouses fell by around 30% in the period 1996-1999, after which it rose by 13% in 2000. In greenhouse production, the proportion of total revenue accounted for by aid declined from 20% to 16% in the period 1996-1999. All the aid is national aid.

More than half of the production cost consists of goods and supplies, energy and other variable costs. In contrast with basic agriculture, the wage cost of outside labour is a significant item in greenhouse production; in the period 1996-2003e it has been 18% of the production cost. The farming family's own wage and capital income requirement has been around 21-29% of the production cost. The production cost has been during the entire review period 4-13% higher than revenue, i.e. production has been loss-making. The profitability coefficient of greenhouse enterprises fell from 0.80 to 0.40 in the period 1996-1999, i.e. at that time the entrepreneur family received only 40% of their wage and capital income requirement. In the period 2000-2003e the profitability coefficient was 0.60-0.71.

In greenhouse production, national aid is of decisive importance, because in the period under review aid has been greater than the entire family enterprise income. Aid was 1.5-2.0 times the size of family enterprise income in the period 1996-1999, 1.4 times the family enterprise income in 2000 and around 1.2 times the family enterprise income thereafter. The loss-making nature of production increases the significance of aid. In the period 1996-1997, aid was 5-15% greater than the entrepreneur family's wage and capital income requirement and in the period 1998-2003e it has fluctuated between 76% and 86% of the entrepreneur family's wage and capital income requirement.

6 The significance of national aid in the income and profitability development of AB support area farms and horticultural enterprises

To clarify the significance of national aid for the AB support area's agriculture and horticulture, income and profitability development has been examined in different production sectors, so that conclusions can be made about the effect of national aid on the financial preconditions for the practice of agriculture and horticulture in the area. In Finland unfavourable natural conditions and, for historical reasons, small farm size create a competitive disadvantage that must be compensated for by aid, so that Finnish agriculture can function in the operating environment formed by the EU's agricultural policy and compete on the same terms with other EU Member States. To elucidate this, the proportion of national aid as a subfactor of profitability has been examined in the evaluation.

Development of income and profitability in different production sectors

In terms of the main production sectors, an examination of income and profitability made for the period 1995-2003e and on the basis of a longer time series, which appears in the figures of Appendix 6, showed that the profitability of AB support area farms has been poor. On dairy farms the profitability coefficient in the period 1995-2003e has been 0.49-0.57, on beef farms the profitability coefficient has risen from 0.39 in the final years of the period to 0.72 and on cereal farms correspondingly to 0.68. In greenhouse production the profitability coefficient was 0.60-0.71. The profitability criterion was achieved only on pig farms, excluding the weakest years for production conditions. In sugarbeet production, too, the profitability target was nearly reached in the best years.

The average hourly earnings of an agricultural worker, which is used as the farming family's wage requirement in the profitability criterion, is low (7.57 euros in 2000) in comparison with the hourly wages of workers in other industries. For example, the average hourly earnings of industrial workers in 2000 were 15.11 euros/hour. When comparing the family farm income of full-time farms with the wage income of an industrial worker, the family farm income of full-time farms calculated per farmer and his/her spouse was around 62% of the wage income of an industrial worker in 1995, 58% in the agriculturally weak years of 1998 and 1999, and 59% in 2000 (Väre 2000, 2003).

National aid has had very great significance in the formation of agricultural income in the AB support area in the period 1997-2003e. According to forecast results for the period 2001-2003, national aid covered approximately 40-70% of family farm income received as compensation for work and own capital invested on cattle and pig farms, the whole of family farm income and also part of production costs on egg and broiler farms, around 30% of family farm income on cereal farms, and the whole of family farm income in greenhouse enterprises. The proportion of family farm income accounted for by national aid in the period 2001-2003e has fallen in all production sectors except for cereal and pig farms (Table 24).

Table 24. The proportion of family farm income accounted for by national aid for Southern Finland in the main production sectors in the AB support area, 1997-2003e. (MTT: FADN data, Statistics Finland: MYTT).

	1997-1999	2000	2001e =>2003e
Dairy farms	52	43	43 =>42
Other cattle farms	120	69	68 =>66
Pig farms	113	77	57 =>61
Egg farms	120	95	176 =>121
Broiler farms	111	119	112 =>108
Cereal farms	78	22	26 =>29
Sugarbeet farms	61	48	…
Open-field vegetable farms	29	26	…
Greenhouse enterprises	190	143	123 =>118
Sheep	over 200	170	177 => 104

Due to the low profitability of agriculture, it has been possible to safeguard the continuity of production in the main production sectors in the AB support area only through national aid. Without national aid, the proportion of a farming family's wage and capital income requirement accounted for by family farm income would have been very low and in poultry and greenhouse production, for example, there would have been no family farm income at all. Moreover, without aid most dairy and cereal farms would have suffered a profitability crisis because, as a distribution of these farms showed, market returns alone do not cover the whole of production cost in any farm group, and on around half of farms it covered only variable costs. If only variable costs can be covered by total revenue, replacement investments cannot be made and long-term continuation of production is impossible. The low profitability provides no motivation to entrepreneurial activity and it does not allow the development of farms. Even on debt-free farms, the low profitability causes liquidity problems, whereupon the farming family's income level remains very low. The continuation of low profitability on farms causes serious financial problems for the entire production industry.

To clarify the realisation of sought-after economies of scale that improve profitability with the aid of structural development, the evaluation has examined the effect of the growth in farm size on the development of profitability on dairy, pig and cereal farms in 1995, 1997 and 2000 in the main production sectors. The profitability coefficient has, as a rule, increased with the growth in farm size in all three production sectors:

1995 =>2000	8-16 ESU	16-40 ESU	40-100 ESU	100 – ESU
Diary farms	…	0.57 =>0.51	0.61 =>0.68	…
Pig farms	…	0.55 =>0.59	0.67 =>1.14	1.54 =>1.04
Cereal farms	0.54 =>0.23	0.77 =>0.82	0.80 =>1.28	…

On the largest farms, profitability has not been higher in all years than in the next largest farm-size category, most likely due to adjustment costs resulting from expansion investments. In the period 1995-2000, profitability rose in most farm-size categories. On small cereal farms, though, it fell to a very low level. The better profitability of large farms shows that by increasing farm size it is possible to improve the profitability of agriculture and that farmers have incentives to continue structural development. Because a comparatively low farming family wage requirement (the average hourly earnings of an agricultural worker) has been used as a basis for the profitability criterion, the level of profitability, however, is comparatively low and incentives modest even on large farms.

Profitability of investments

Invention aids have a major significance in initiating production expansion and development measures, but high investment aids can also tempt farmers into taking too big risks and into unprofitable investments, which result in a weakening of farms' liquidity. On the other hand, as a result of relatively low internal financing and poor profitability, farmers' opportunities to invest with their own internal financing are rather limited. Without income support and investment aids, a large proportion of investments would not be implemented. Agricultural expansion investments have increased profitability particularly where the farm's profitability was previously weak. Such farms, though, are always in greater danger of a liquidity crisis than farms which are already profitable.

Investment aids have served to reduce the farmer's risk and they have been highly significant in initiating building investments and other investments relating to farm development. Pietola et al. (1998 and 2001), in their research on the profitability of livestock farms' building investments, have taken the unforeseen fluctuation of prices into account using the real option method. According to calculations that take the price risk into account, profitability is satisfactory only in exceptionally large pig and cowshed investments. In 2002, the profitability condition was marginally fulfilled in a cowshed for 64 animals, if all aids are available. In beef production the investment profitability condition was fulfilled only in the 200 livestock unit model, in piglet production in the 260 sow unit model, and fattening pig investments proved not to be profitable at all. Thus producers have had to take big risks in their investments, because units of a size shown to be profitable in the research are still relatively rare in Finland.

The mutually complementary nature and suitable ratio of income supports and investment aids are emphasised in a survey of farmers conducted in autumn 2002. The farmers' survey shows that livestock farmers in the AB support area consider that nationally payable production aids are highly important in terms of decisions relating to the scope of production. Of farmers who had made or were planning livestock building investments, most of the AB support area farmers considered both forms of support, production aid and investment aid, to be important in terms of implementing the investments. The temporary nature of national

animal husbandry aids for Southern Finland has affected the timing of farmers' decisions relating to production and its scope on around 55% of pig farms and on more than 40% of other livestock farms.

Structural development

Farm structure has changed very rapidly in the AB support area. The number of active farms decreased by more than half in the AB support area in the 1990s. The agricultural production of the AB area has become increasingly dominated by crop production. The average field area of farms grew from around 25 hectares to 32 hectares in the period 1995-2001. Most of the growth in the field area of farms has taken place through the renting of fields. Nearly 60% of the increase in field area consisted of fields rented for the farm. Rapid structural development has meant that the farm structure of the area has deteriorated at the same time. The small size of a land parcels does not only increase the work input per unit area; it also restricts the farmer's technology choices.

Despite structural development, the farms of Southern Finland are small; the average size was 30.7 field hectares in 2000. In the same year, Swedish farms were on average around 7 hectares (23%) larger, German farms 5.6 hectares (18%) and Danish farms 15 hectares, nearly 50%, larger. In contrast with a hectare-based comparison, an ESU-based farm distribution comparison highlights Denmark's large livestock units and the overwhelming efficiency of Denmark's farm structure in the pursuit of economies of scale in agriculture. On AB area farms this economic farm size was 22.7 ESUs in 2000. Swedish farms were around 4 ESU (15%) larger and German farms around 18 ESU (80%) larger than in Finland. In Denmark's livestock-dominated agriculture the farms were actually 39 ESU larger, i.e. 2.7 times as big as the farms of Southern Finland.

In the period 1995-2000, the average ESU farm size has grown in Southern Finland 32%, i.e. faster than in the other comparison countries (13-30%) with the exception of Germany. In 2000, 19% of the farms in Southern Finland belonged to the largest farm-size groups of more than 40 ESUs. The corresponding figure in Sweden was 30%, in Germany 26% and Denmark 43%.

Productivity development

In the period 1995-2000, agricultural productivity development Finland was weak, rising by an average of 1.1% per year. The productivity development means that in 2000 around 5.7% higher output was obtained than in 1995 with the same amount of inputs (Myyrä & Pietola 2002). The productivity development of agriculture as a whole, however, has been faster on average than productivity development of individual production sectors. The production of the AB area is of major significance in the productivity development of pig and cereal farms. In the early years of EU membership, the productivity development of pig and cereal farms

was faster than that of dairy farms, but in 1999 and 2000 the productivity development of pig and cereal farm declined sharply.

The productivity of dairy farms has improved, although slowly, during the entire period under review through an increase in average yields of livestock and liberalised quota trading. The poor productivity of beef production is a result of the fact that beef production in Finland takes place alongside milk production partly or completely with dairy-breed livestock. The productivity development of pig farms has been adversely affected by an adjustment delay in applying the production technology of large-scale farms. Due to weather conditions, 1998 and 1999 were years of crop failure, which weakened the productivity not only of cereal farms but also of pig farms. The typical cereal farm investments in dryers and machine halls take longer to appear in productivity development than e.g. extensions of livestock buildings.

Results indicate that positive, but very modest productivity development has been achieved through rapid structural development. Development has been so slow, however, that alone it is insufficient to solve the profitability problems of Southern Finland. Due to natural disadvantage, the utilisation rate of the field cultivation machines required by structural development is low in Finnish conditions. The low productivity development also indicates a lack of sufficient incentives, for example in beef production. Boosting productivity requires higher profitability expectations on the part of farmers as well as greater certainty in terms of the sufficiency and permanence of aid in the area.

7 The significance of national aid in integrating agriculture into the common agricultural policy

The objective of the evaluation is to clarify the application of aid measures belonging to the aid scheme agreed in 1999 (Commission Decisions 97/428/EC and 2000/167/EC) and the effects on the integration of Finnish agriculture into the common agricultural policy. The integration of Finland's agriculture and producers into the EU's agricultural policy has been evaluated by examining price integration, the structural development of agriculture and the profitability of production as factors affecting producers' operating opportunities as well as related factors. Due to small farm size and the disadvantage resulting from natural conditions, production costs are high in Finnish agriculture, which is why higher levels of aid than in other EU countries are required in order to achieve profitable production.

Financial integration

After Finland joined the European Community, producer prices of agricultural products fell in 1995 by an average of 39% and agriculture input prices by 20%. Excluding milk, bread grain and broiler meat, the prices of all the main agricultural products fell more than was anticipated.

Price integration includes the integration into the common market of both producer prices and input prices. In markets which are integrated, price changes are reflected from one market area to another so that there is no scope for significant arbitrage between prices. Research results show that Finland's agricultural products market has integrated into the EU's common market such that price information about price changes occurring elsewhere in Europe is communicated quickly into Finland. Market prices have integrated even in respect of such products whose markets have traditionally been very local (e.g. fresh potato).

The development of Finnish agricultural input prices has followed the development of comparison countries, even though Finnish prices have not fallen quite to much as the EU15 average nor have they risen as much as some of the comparison countries. Finland's small market and geographically remote location partly explain why business costs in Finland are higher than in the more intensive and densely settled agricultural areas of the EU. In Finland, however, there are no barriers to market access in the agricultural inputs market. An example of this is the fact that new manufacturers, importers and traders have entered the inputs market in recent years.

After membership, food prices fell less than anticipated, by an average of 9%, while no great changes occurred in the structure of consumption itself. In the period 1996-2002, no great changes took place in the relationships between the consumer price levels of different EU countries; Finland's price level was lower than Sweden and Denmark but more expensive than other comparison countries. The differences of retail prices is also partly due to the fact that value-added tax on food (17%) is higher in Finland than in the EU on average.

Natural disadvantage

The natural disadvantage arising from Finland's northern location affects the production opportunities of agriculture and horticulture in many different ways. Section 3.1 of this report examined the impact of Finland's northern location on agricultural and horticultural production based on panels of experts organised by MTT Economic Research. Natural disadvantage is evident throughout all agricultural production, lowering outputs while increasing costs at the same time. Due to natural disadvantage

- crop yields are lower than in other EU countries,
- winter-proof building and equipment solutions increase labour and capital costs,
- the seasonal nature of farming work causes peaks of working activity and a need for more efficient mechanisation than agriculture in Central Europe,
- feeding of livestock gives rise to additional costs, because feed is produced on a larger area and has to be stored over a long winter,
- long distances and a small market give rise to additional costs not only for agriculture but also for the operations of the entire food chain.

The predominately small-farm structure can be developed through investment, and technological development can to some extent help in overcoming the natural conditions. Because the natural disadvantage cannot be removed, however, it generates additional costs in high-technology solutions compared with competing countries, while at the same time low yield levels reduce farmers' financial results on the revenue side.

Structural and profitability development of agriculture and horticulture

The changed financial environment as a result of EU membership and the consequent weakening of agricultural profitability strongly shaped the structural development of agriculture, which continued at a rapid pace during the entire 1990s. In the period 1990-1995, the number of farms in the AB support area fell by 40% and by nearly a further quarter thereafter. The average farm size of the area increased during EU membership from 25 field hectares to 32 hectares, mainly due to land rentals, which became possible as small farms gave up production. Despite the rapid structural development, the average farm size in field hectares in the AB area is 20-50% smaller than in Sweden, Germany or Denmark. Differences in economic farm size are significantly larger than this, particularly in comparison with Germany and Denmark. Structural improvement is sought through means that promote generation changes and facilitate early retirement, whereupon the optimum farm size is determined according to limitations set by the production sector and natural conditions and according to farmholders' own situation and capabilities.

Rapid structural development has not achieved a very significant rise in productivity in the agriculture of the AB area. But because on larger farms profitability has been better as a rule, farmers have had incentives to invest and expand production. As sections 5 and 6 of this report reveal, national aid has had a decisive significance in the formation of agricultural income and in safeguarding the continuity of agriculture and horticulture in the area. The proportion of family farm income accounted for by national aid has also been significant on the largest and most profitable farms. A survey of farmers conducted in autumn 2002 shows that farmers themselves also emphasise the importance of income supports as a factor influencing investment decisions.

The significance of agriculture and horticulture in the AB support area

For Finnish agriculture the agriculture and horticulture of the AB support area is highly significant because, depending on the production sector, the area represents 25-75% of Finland's livestock production, more than 90% of wheat, malting barley and sugarbeet production, more than half of horticultural output, and 40-75% of the production of the other key crops. The country's largest food industry processing plants and food factories are located in the area. A significant number of companies that manufacture production inputs are also located in the area. The operations of these companies strongly rely on the area's diverse agriculture and horticultural production. The area of Southern Finland accounts for 70% of

the whole country's gross domestic product and 67% of employees, but only 20% of Finland's surface area. Some 66% of the whole country's food industry employees work in the Southern Finland area. The importance of agriculture is also emphasised in farms' own entrepreneurial activity, because entrepreneurial activity connected particularly with primary production has increased most in recent years on the pluriactive farms of the area. Around 40% of the entrepreneurial activity that takes place on farms is located in the AB support area. The area also has more than a third of the rural small enterprises that operate outside farms.

The AB support area is characterised by the presence of large population centres in the area, but it also has a rural heartland and sparsely settled areas. The population centres are very significant for the employment opportunities of the rural areas close to them. In the remote rural and rural heartland areas, agriculture is very important as an employer. Around 56% of municipalities in the area were one of these rural area types in 2000. The rural communities that surround the large towns and cities have benefited from population growth, but in provinces that are suffering population losses people of working age are moving away and the natural population loss is also greater in these areas due to the population ageing.

The significance of agriculture and horticulture for the environment

In the AB support area, 93% of farms and 97% of arable land fall within the sphere of environmental support. Factors relating to environmental quality are monitored in connection with evaluations relating to the payment of environmental support and the aid scheme. Following EU membership, research into the quality of the environment has increased significantly in Finland. A wide range of indicators have been developed to monitor environmental quality and these are renewed every few years. The nitrogen, phosphorous and other nutrient balances, which measure the state of the environment, are showing long-term declines.

The importance of preserving a managed rural and cultural landscape is emphasised in Southern Finland as a counterweight to the presence of the large population centres. The AB area is also very important for tourism. In southernmost parts of Finland there are 14 areas of national value, of which eight are extensive farming landscapes. The objective is to maintain the continuity of historical land use and the cultural history of these areas also in future by keeping them in agricultural production. In Finland only seven per cent of the land area is arable land and thus every open field or pasture area is valuable in terms of the rural landscape. The AB support area is also stamped to a significant degree by a marine element, in which the extensive Turku archipelago and the autonomous area of the Åland Islands with their versatile farm structure represent a unique archipelago setting.

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Appendix 1 (1/1). Abbreviations used in the report.

AB. area A and B support area.

AWU. Annual Work Unit. Unit of annual work input.

ESU. European Size Unit. Unit based on economic size. (http://europa.eu.int/comm/agriculture/rica/methodology1_en.cfm)

Eurostat. EU countries' statistics authority.

EU aids. EU's CAP aids and aids partly funded by the EU (Compensatory allowance (LFA) and environmental support).

FADN. The Farm Accountancy Data Network. EU's agricultural bookkeeping system. (http://europa.eu.int/comm/agriculture/rica/index_en.cfm)

FWU. Family Work Unit. Unit of work input by a farming family.

MELA. Farmers' Social Insurance Institution.

MMM. Ministry of Agriculture and Forestry.

MTT. Agrifood Research Finland.

MYEL insurance. Farmer's Pension Insurance.

MYTT. Enterprise and Income Statistics of Agriculture and Forestry.

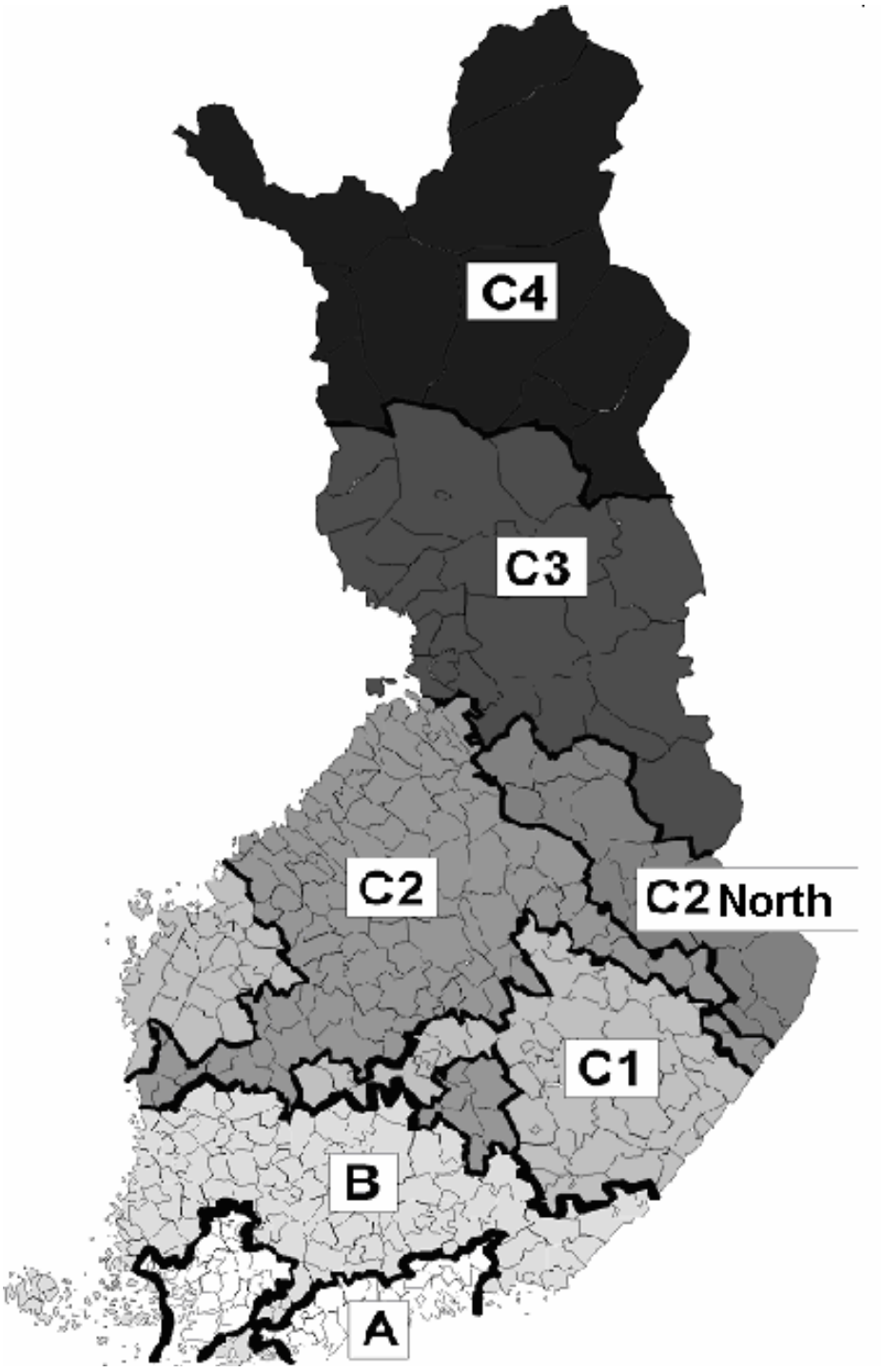
PYR. Horticultural Enterprises Register.

Rahtu register. MMM's monitoring data on farms which have received investment support.

SGM. Standard Gross Margin. (http://europa.eu.int/comm/agriculture/rica/methodology1_en.cfm)

Tike. The Information Centre of the Ministry of Agriculture and Forestry.

Appendix 2 (1/1). Support area map.



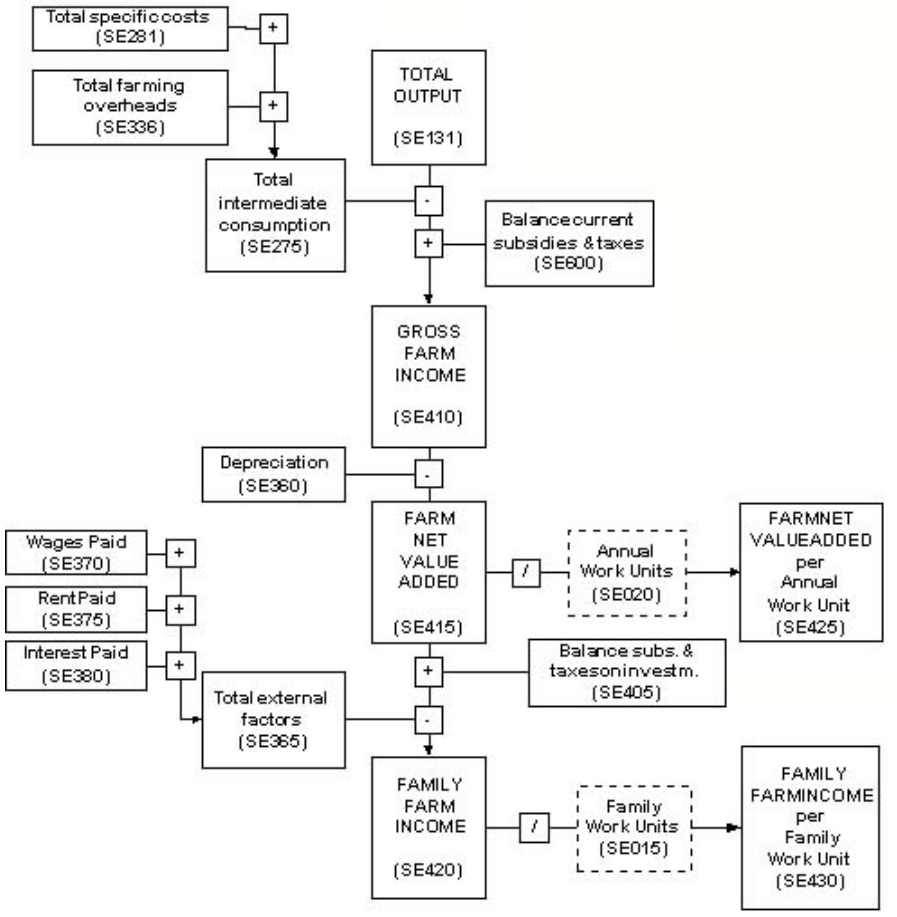
Appendix 3 (1/1). Financial concepts.

Profitability coefficient is a key figure that describes relative profitability. The profitability coefficient is obtained by dividing family farm income by the sum of the interest requirement for the family's own capital and the family's own wage requirement. The profitability coefficient takes the amount of own capital and work input into account, so it is suitable for comparing farms of different sizes and representing different production lines.

Family farm income is the compensation received by the farming family for its own agricultural work and for the capital it has invested. Family farm income is calculated by subtracting from the production cost all other costs except for the farming family's wage and capital income requirement. Family farm income can also be calculated by deducting wages, rents and interest paid from farm net value added.

Farm net value added is the result that remains as compensation for the farming family's own and outside work, own and outside capital, and rental expenses.

Entrepreneurial profit (loss) is a key figure that describes profitability. Entrepreneurial profit (loss) is calculated by subtracting from total revenue all of the production costs including the farming family's wage requirement and own capital interest requirement. Entrepreneurial profit (loss) can also be calculated by subtracting the farming family's wage requirement and own capital interest requirement from family farm income.



(http://europa.eu.int/comm/agriculture/rica/index_en.cfm)

Appendix 4 (1/2). Agricultural income support in Finland in the period 1995-2003.

The income support scheme for Finnish agriculture is based on forms of aid under the common agri-agricultural policy. The most important of these are the crop production and livestock aids completely funded by the EU (CAP aids) and compensatory allowance (LFA) and environmental support partly funded by the EU. The EU-funded crop production and livestock aids are connected with the shift in the focus of supports from price support to direct income support that began in the EU in 1992. By lowering administrative prices, the EU price level has been brought closer to world market prices. Through the Agenda 2000 reform, price support for agriculture has been reduced further. Farmers have been compensated for income losses arising from the lowering of producer prices partly with increased direct income support. Due to the difficult production conditions for Finnish agriculture, Finland was granted additional compensation for cereals and oil crops in the Agenda 2000 negotiations. In addition, silage grass became eligable for CAP areal payment. These special aids granted by the EU also affect the more northerly parts of Sweden.

The compensatory allowance (LFA) applies to areas classified as unfavourable areas in the EU. The purpose of LFA is to secure the continuity of rural businesses in these areas and to keep rural areas settled. In the early years of membership Finland received permission to pay LFA aid only in the B and C support areas. In 2000 the A support area of Finland was also accepted into the sphere of LFA aid. Thus the allowance then covered the entire arable field area.

Environmental support is mainly compensation for the costs and/or income losses arising from measures required to receive environmental support. The support also includes an incentive element. The support is divided into basic measures, additional measures and special support measures. The main objective of the support is to protect waterways, but it also aims to restrict emissions into the air, to reduce risks arising from pesticides and to care for the rural landscape and the biological diversity of nature. A condition of receiving the support is that the farmer commits to adhere to the terms of the support for five years. Although the making of this five-year environmental support commitment is voluntary, 93% of farms and 97% of field area fall within the sphere of environmental support.

Table 1. Agricultural income supports (billion euros) in the whole country, 1995-2003. (Finnish Agriculture 2003).

Paid billion euros	1995	1997	1999	2000	2001	2002	2003e
CAP support	0.21	0.27	0.28	0.39	0.44	0.44	0.46
Compensatory allowance	0.27	0.27	0.30	0.41	0.42	0.42	0.42
Environmental support	0.24	0.27	0.27	0.28	0.28	0.28	0.31
National supports	1.06	0.67	0.57	0.59	0.58	0.59	0.61
Supports total	1.78	1.48	1.42	1.67	1.72	1.73	1.80
- from which EU's share	0.41	0.47	0.51	0.67	0.72	0.72	0.76

Appendix 4 (2/2).

EU aids are supplemented by aids that are nationally paid. Northern aid, national aid for Southern Finland, national aid for crop production and certain other aids are paid from national funds. National aid strives to secure the operating conditions for agriculture in different parts of the country and in different production sectors. Northern aid is long term aid, but national aid solutions for Southern Finland have been for limited periods of time. The forms of national aid for Southern Finland and of national aid for crop production are examined in more detail in section 1.2 of this report.

Appendix 5 (1/3). The structural development of agriculture in different production sectors.

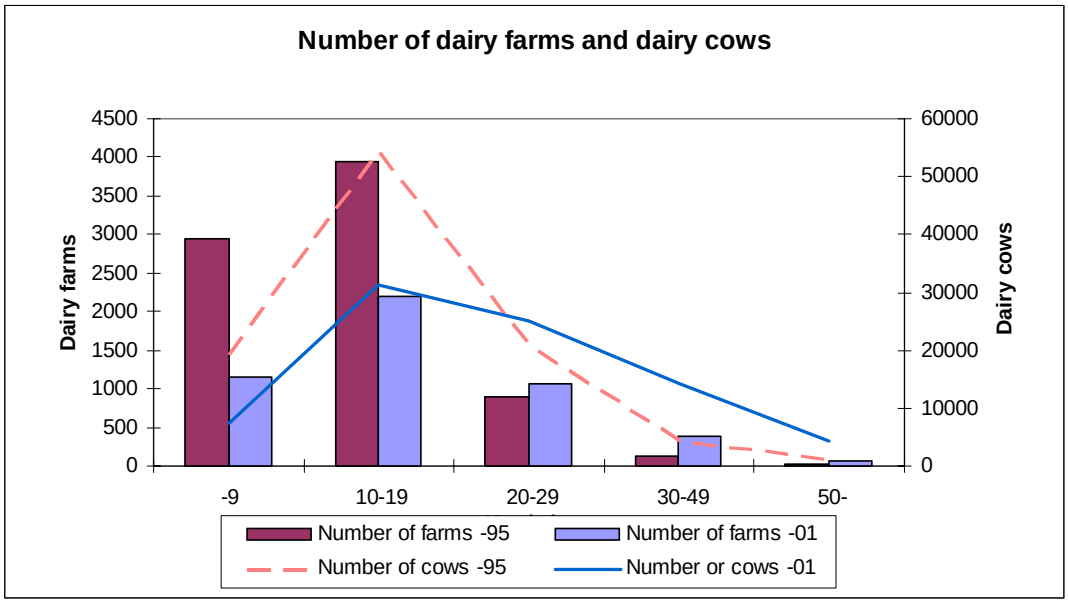


Figure 1. Number dairy farms and cows in the AB support area in 1995 and 2001. (Tike).

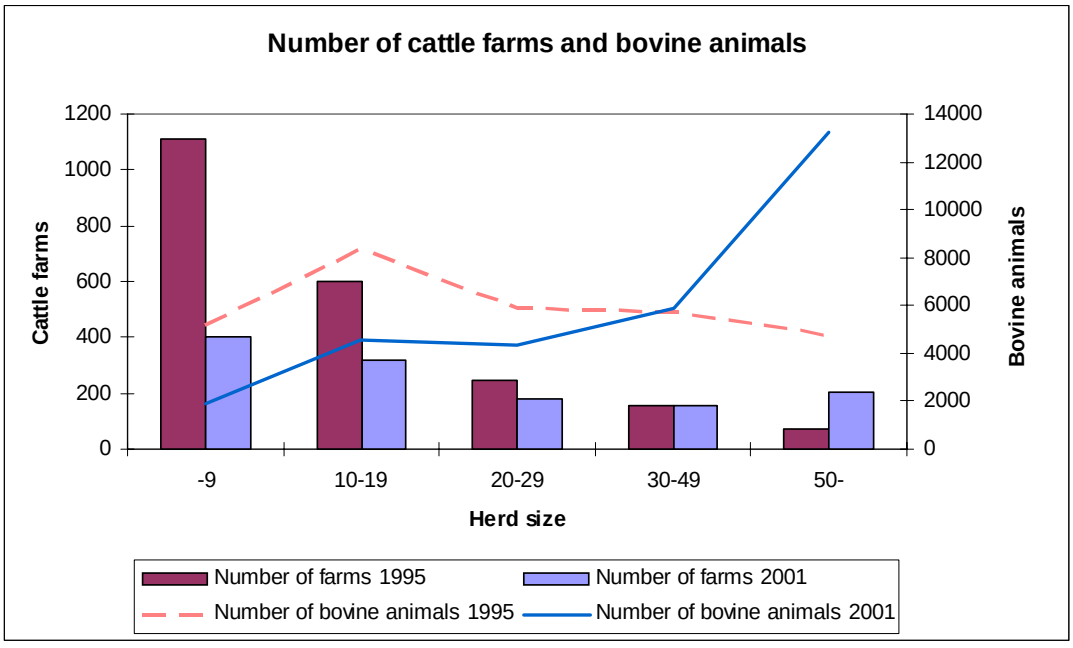


Figure 2. Number of cattle farms and bovine animals the AB support area in 1995 and 2001. (Tike).

Appendix 5 (2/3).

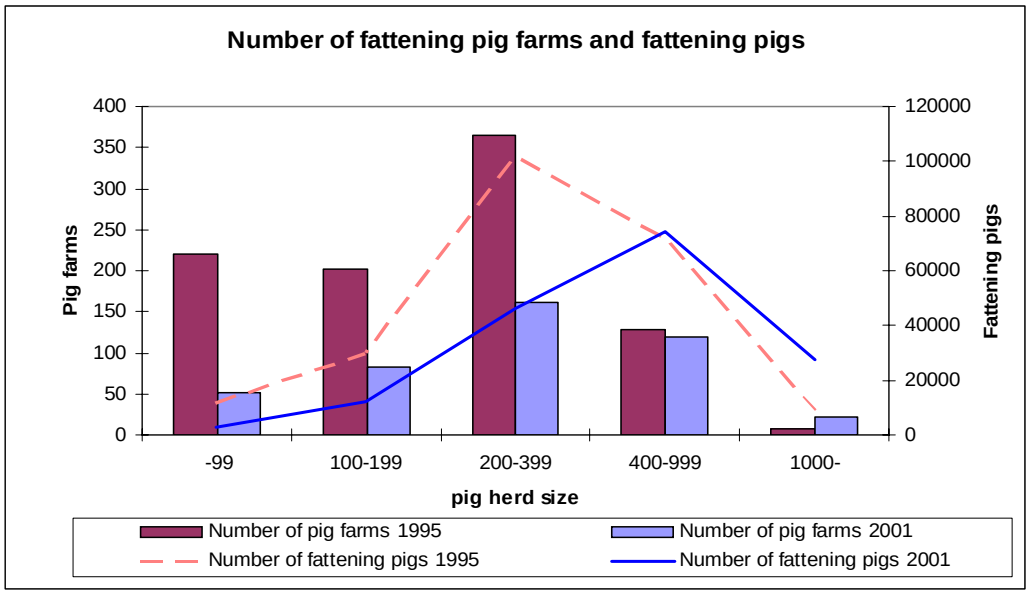


Figure 3. Number of farms specialised in fattening pig production and number of pigs in the AB support area in 1995 and 2001. (Tike).

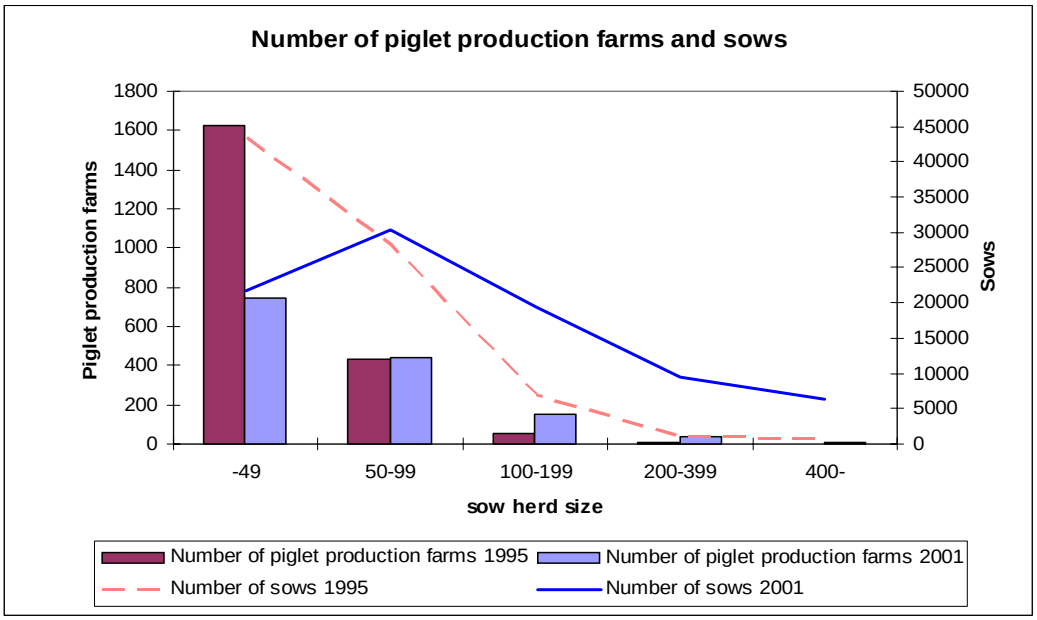


Figure 4. Number of farms specialised in piglet production or in combined piglet and fattening pig production and number of sows in the AB support area in 1995 and 2001. (Tike).

Appendix 5 (3/3).

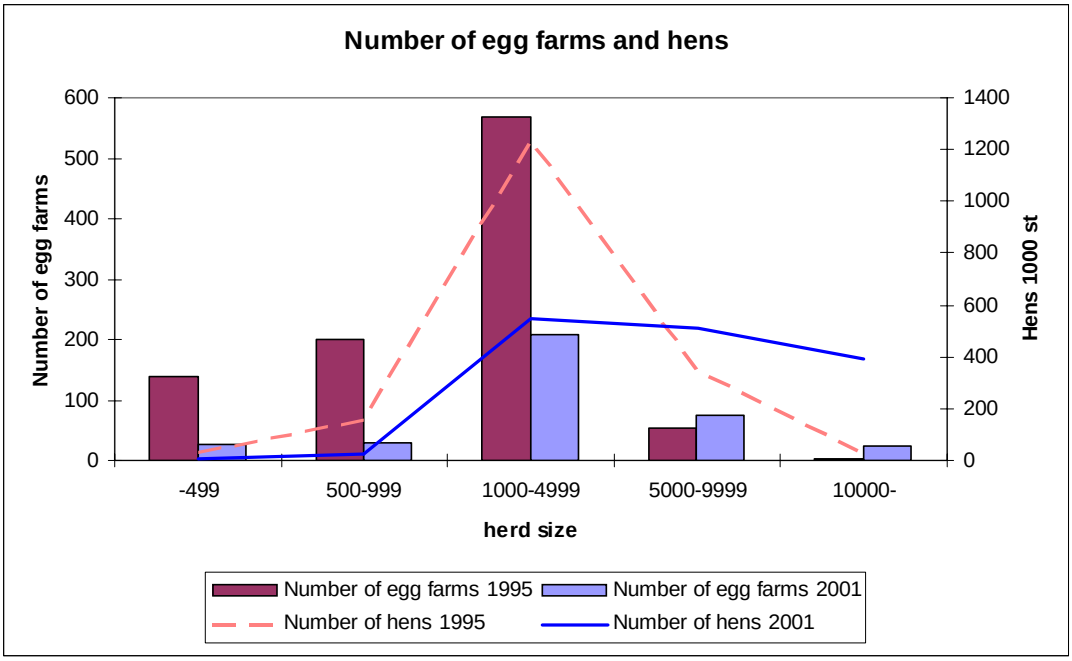


Figure 5. Number of farms specialised in egg production and number of hens in the AB support area in 1995 and 2001. (Tike).

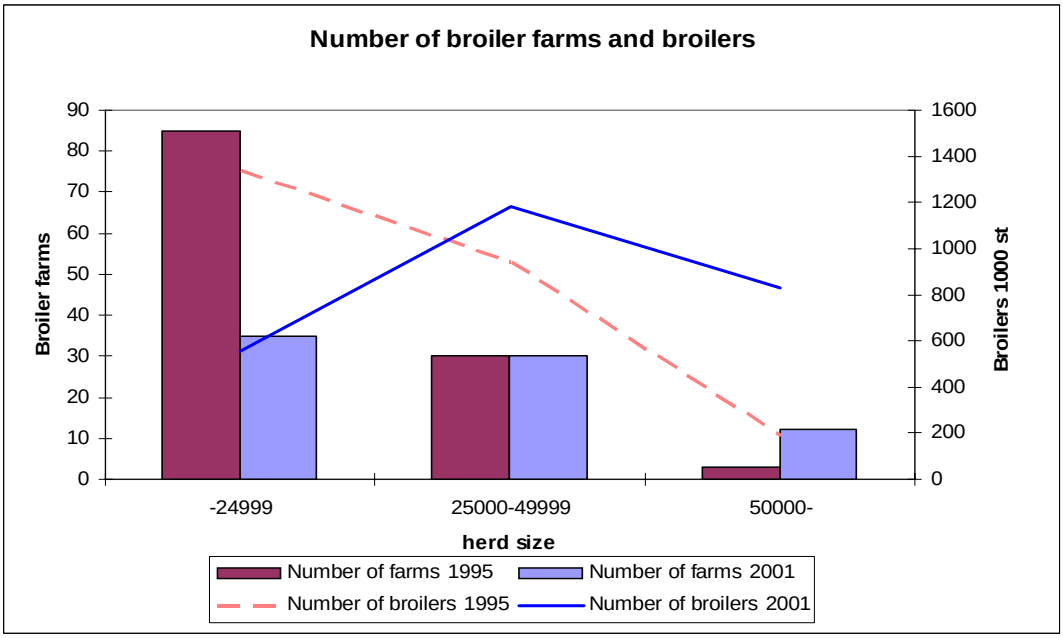


Figure 6. Number of broiler farms and broilers in the AB support area in 1995 and 2001. (Tike).

Appendix 6 (1/8). Income development of agriculture in different production sectors in the AB support area.

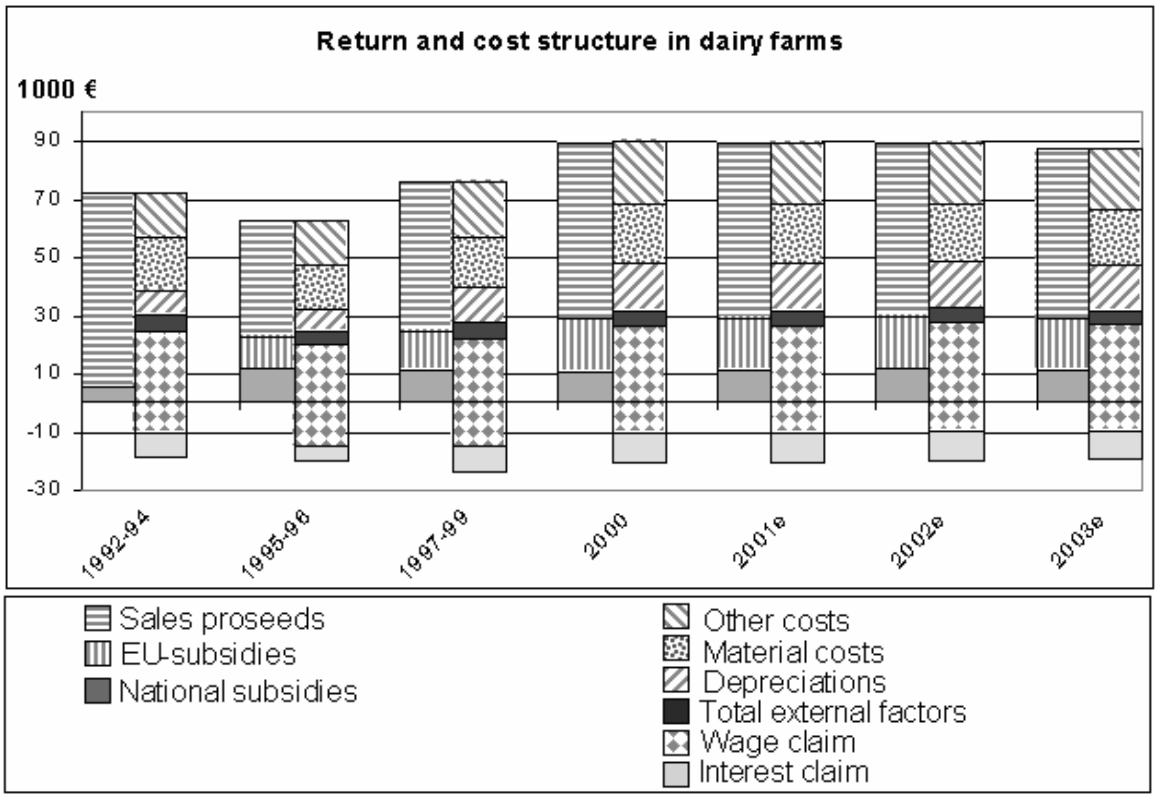


Figure 1a. Return and cost structure of dairy farms in the AB support area in 1992-2003e. (MTT: Bookkeeping farms).

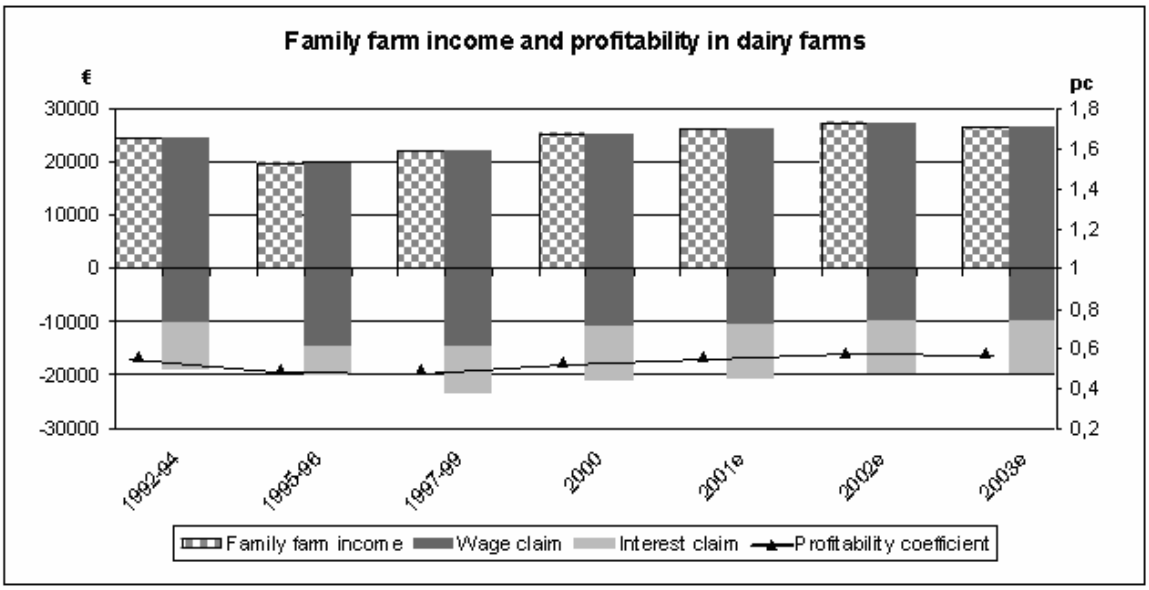


Figure 1b. Family farm income and profitability in dairy farms in 1992-2003e. (MTT: Bookkeeping farms).

Appendix 6 (2/8).

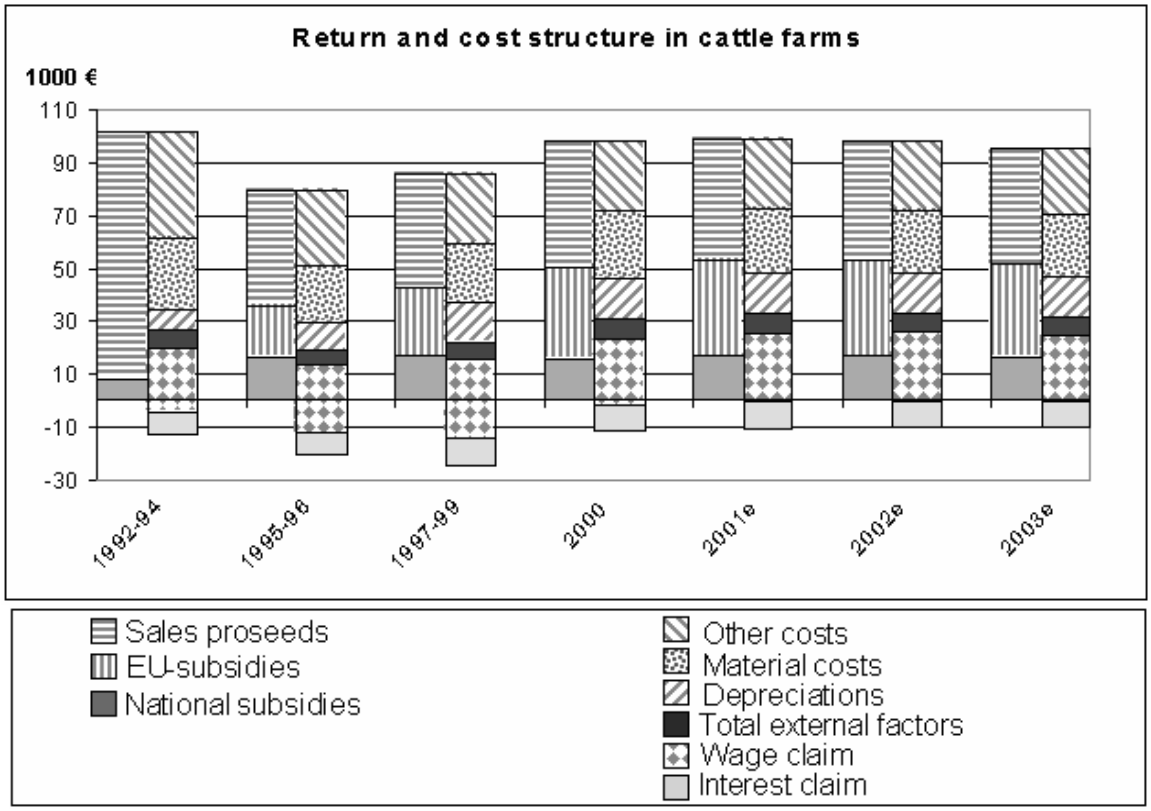


Figure 2a. Return and cost structure of cattle farms in the AB support area in 1992-2003e. (MTT: Bookkeeping farms).

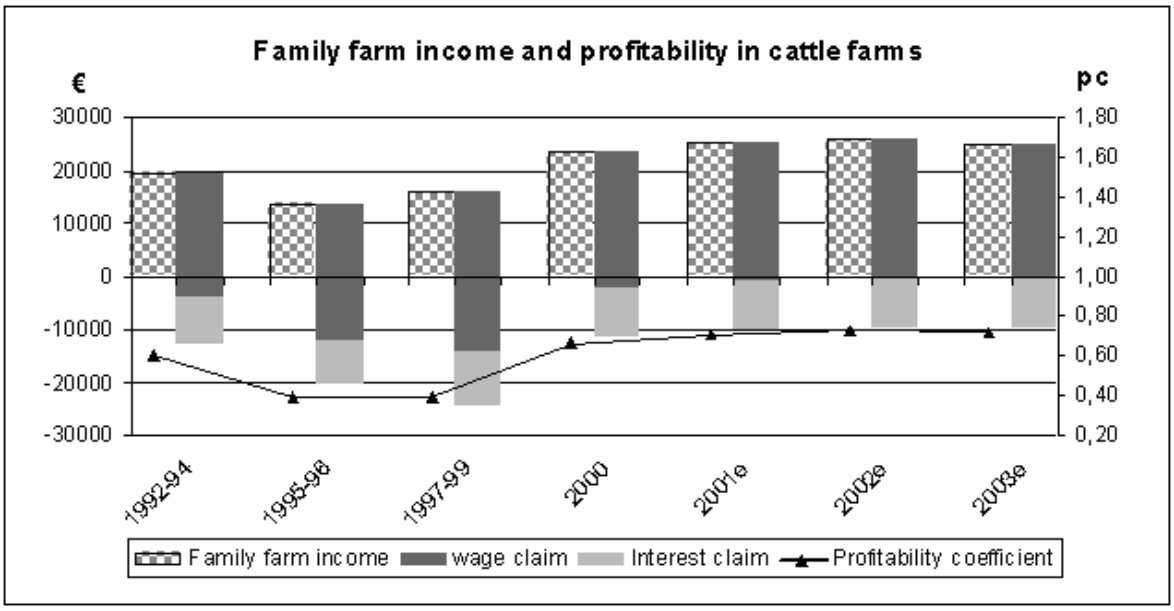


Figure 2b. Family farm income and profitability in cattle farms in 1992-2003e. (MTT: Bookkeeping farms).

Appendix 6 (3/8).

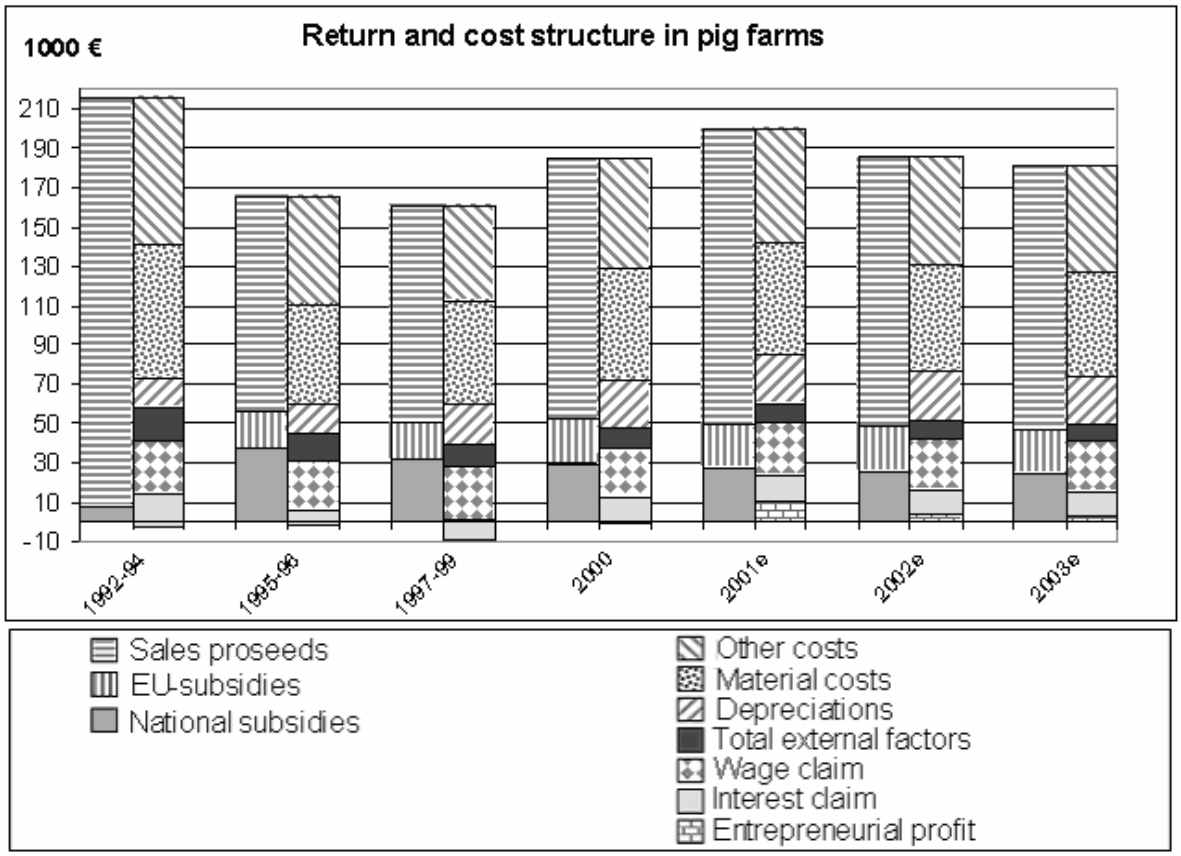


Figure 3a. Return and cost structure of pig farms in the AB support area in 1992-2003e. (MTT: Bookkeeping farms).

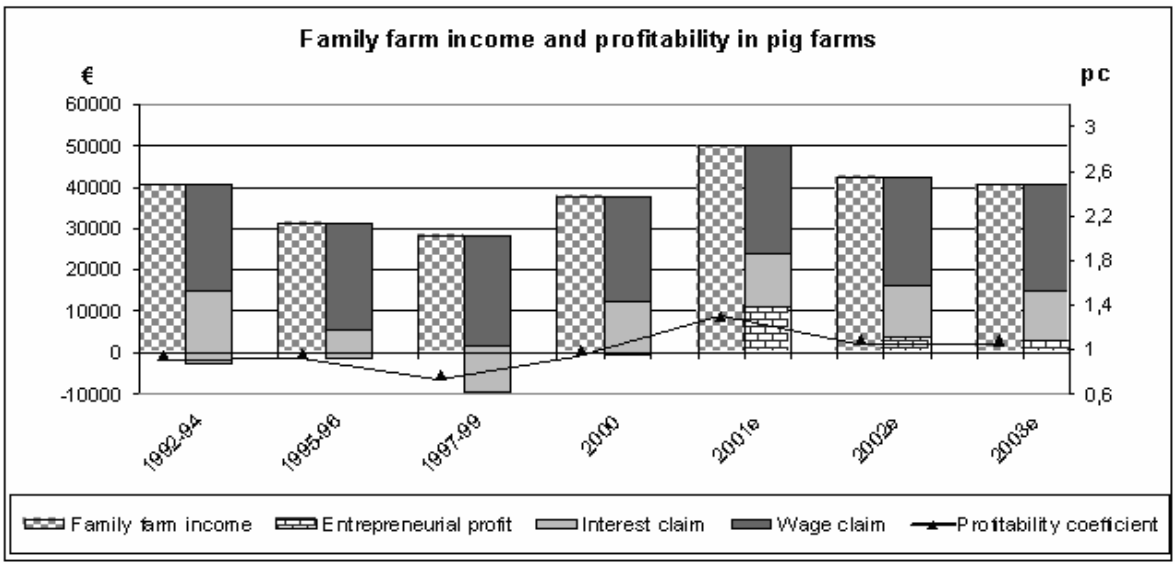


Figure 3b. Family farm income and profitability in pig farms in 1992-2003e. (MTT: Bookkeeping farms).

Appendix 6 (4/8).

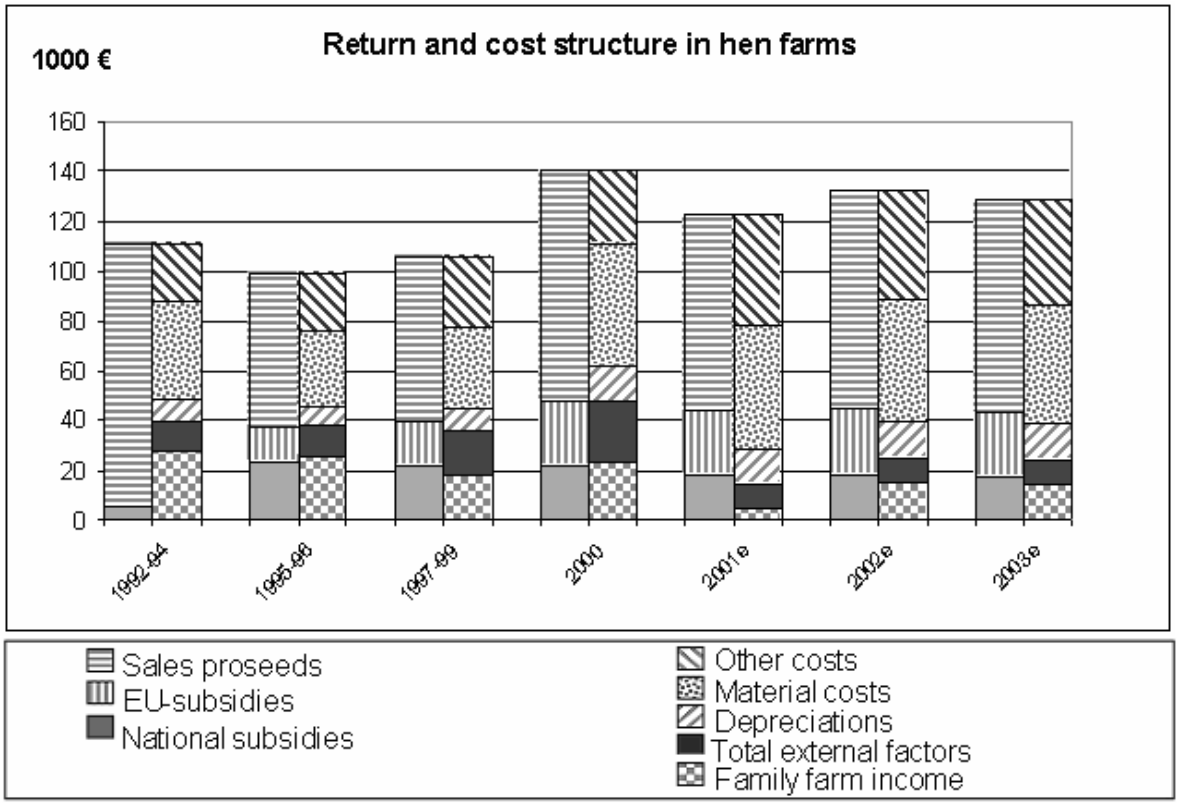


Figure 4. Return and cost structure of egg farms in the AB support area in 1992-2003e. (Statistics Finland, MTT: MYTT data).

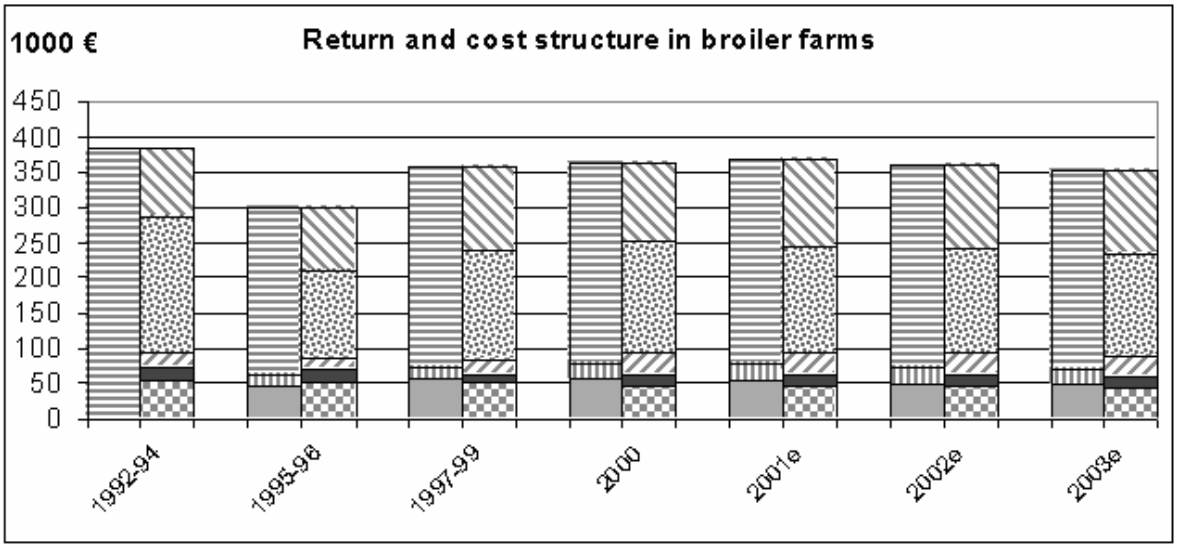


Figure 5. Return and cost structure of broiler farms in the AB support area in 1992-2003e. (Statistics Finland, MTT: MYTT data).

Appendix 6 (5/8).

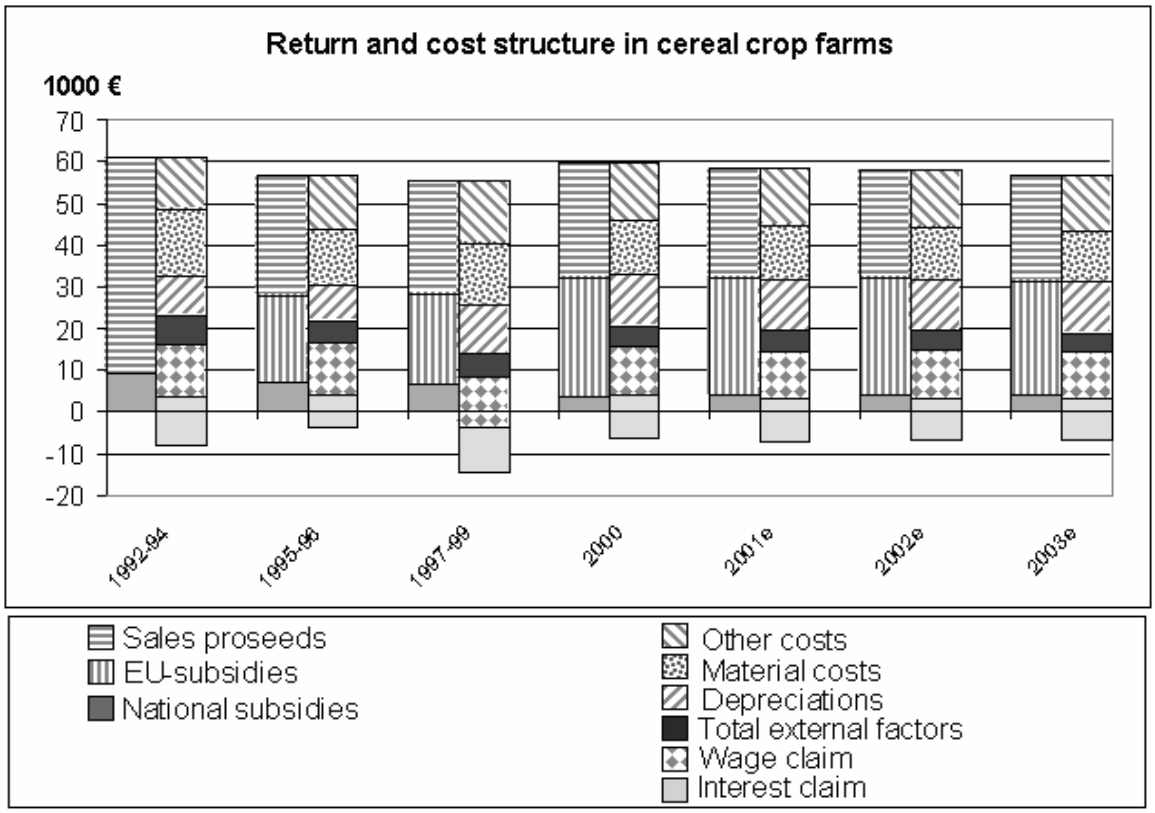


Figure 6a. Return and cost structure of cereal farms in the AB support area in 1992-2003e. (MTT: Bookkeeping farms).

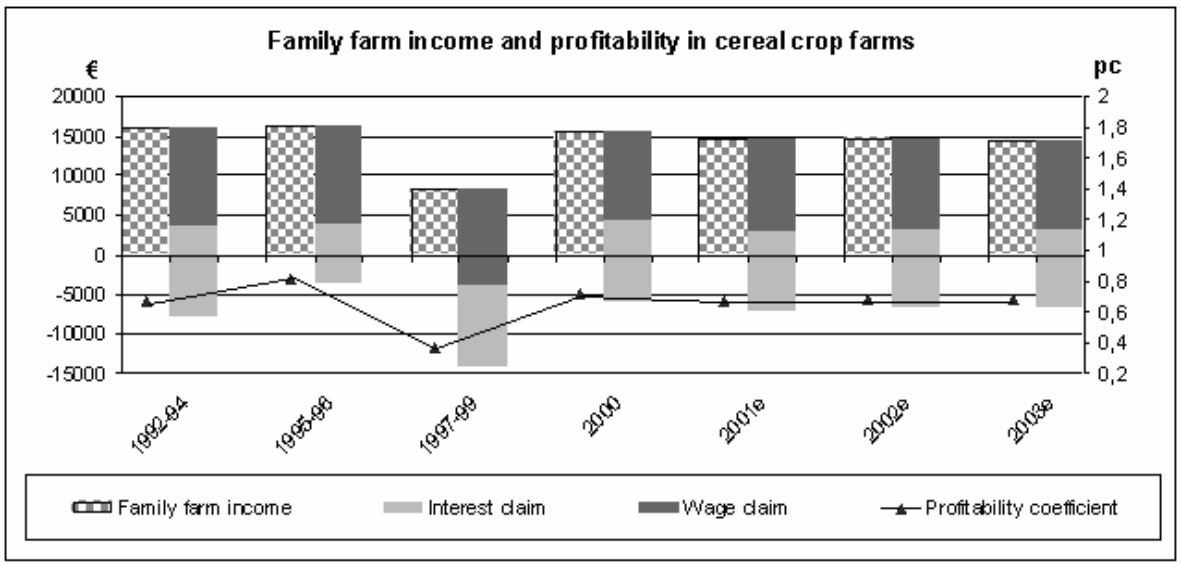


Figure 6b. Family farm income and profitability in cereal farms in 1992-2003e. (MTT: Bookkeeping farms).

Appendix 6 (6/8).

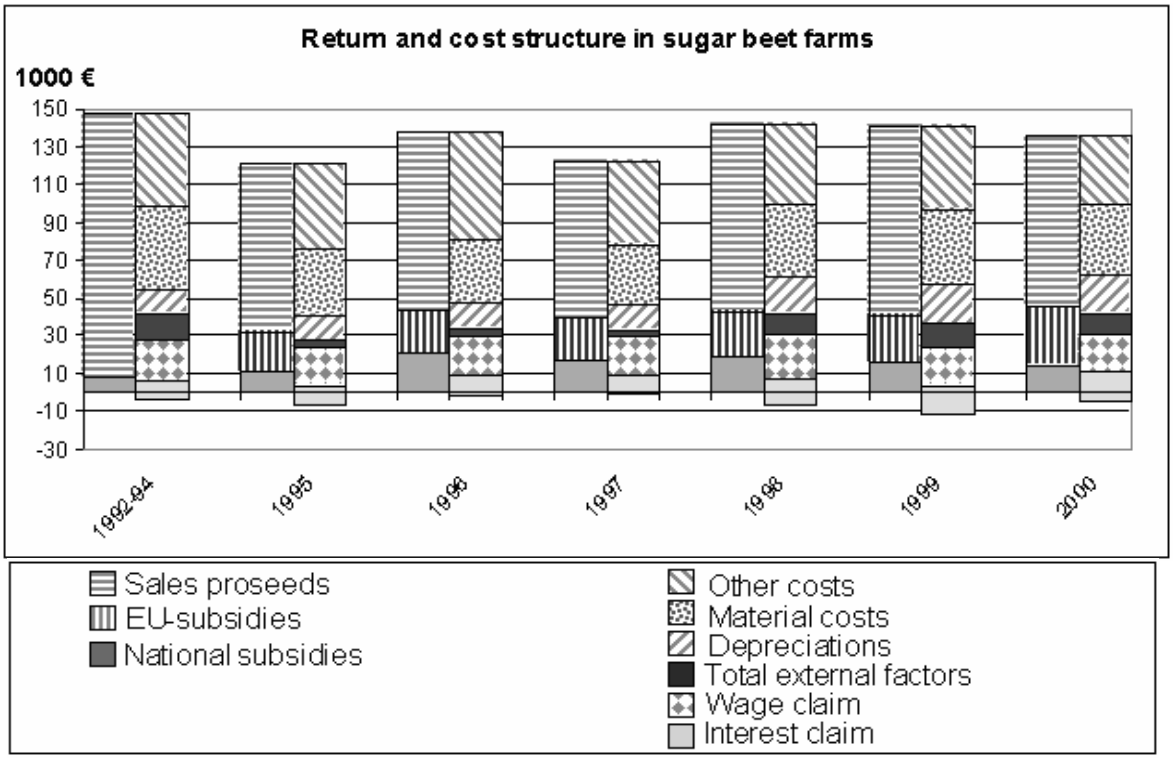


Figure 7a. Return and cost structure of sugar beet farms in the AB support area in 1992-2003e. (MTT: Bookkeeping farms).

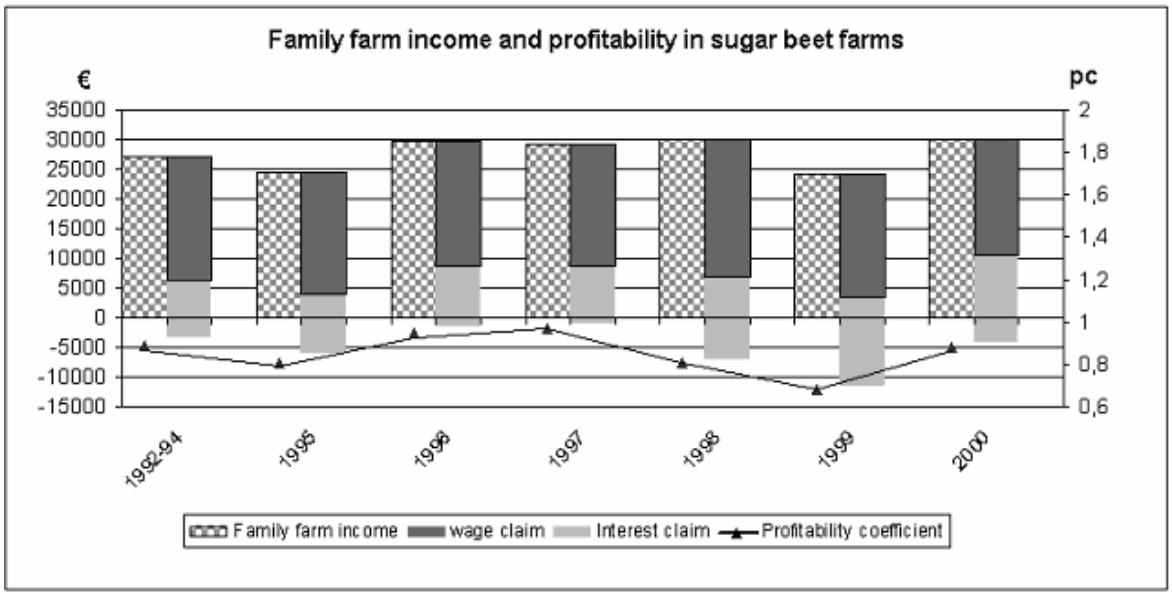


Figure 7b. Family farm income and profitability in sugar beet farms in 1992-2003e. (MTT: Bookkeeping farms).

Appendix 6 (7/8).

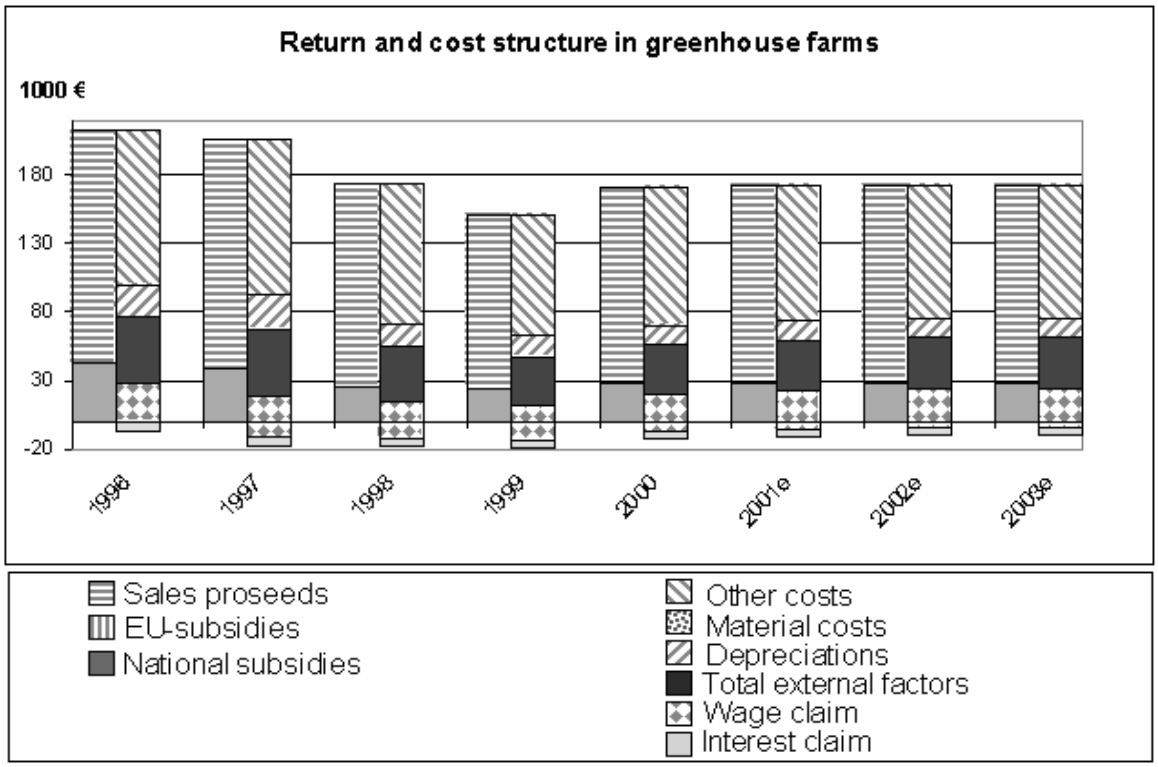


Figure 8a. Return and cost structure of greenhouse enterprises in the AB support area in 1992-2003e. (MTT: Bookkeeping farms).

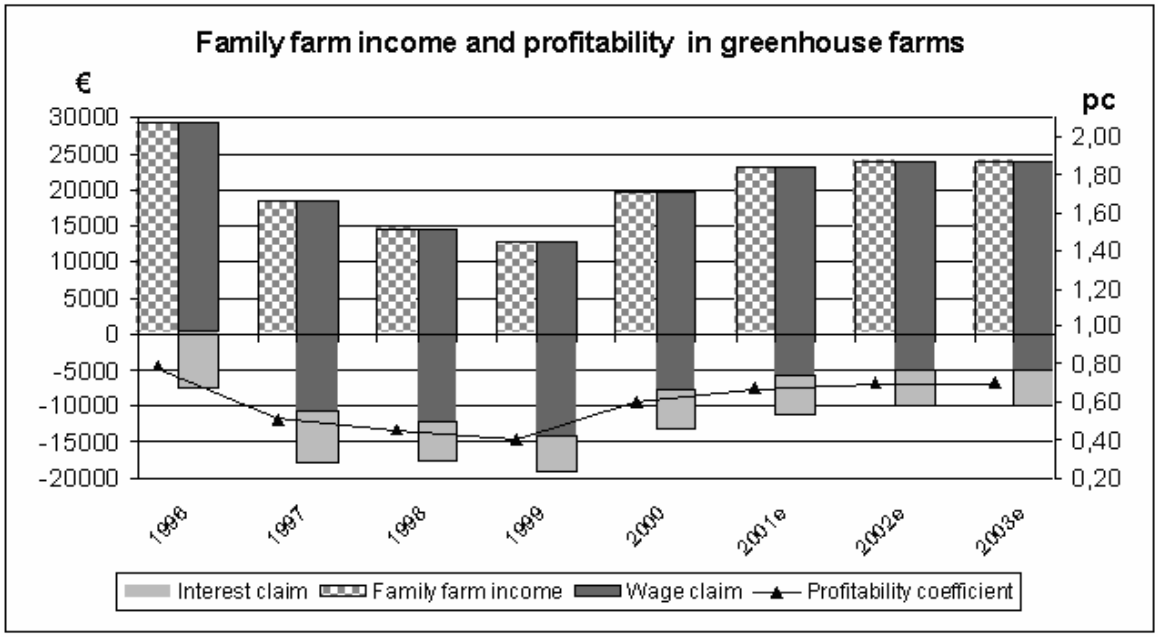


Figure 8b. Family farm income and profitability in greenhouse enterprises in 1992-2003e. (MTT: Bookkeeping farms).

Appendix 6 (8/8).

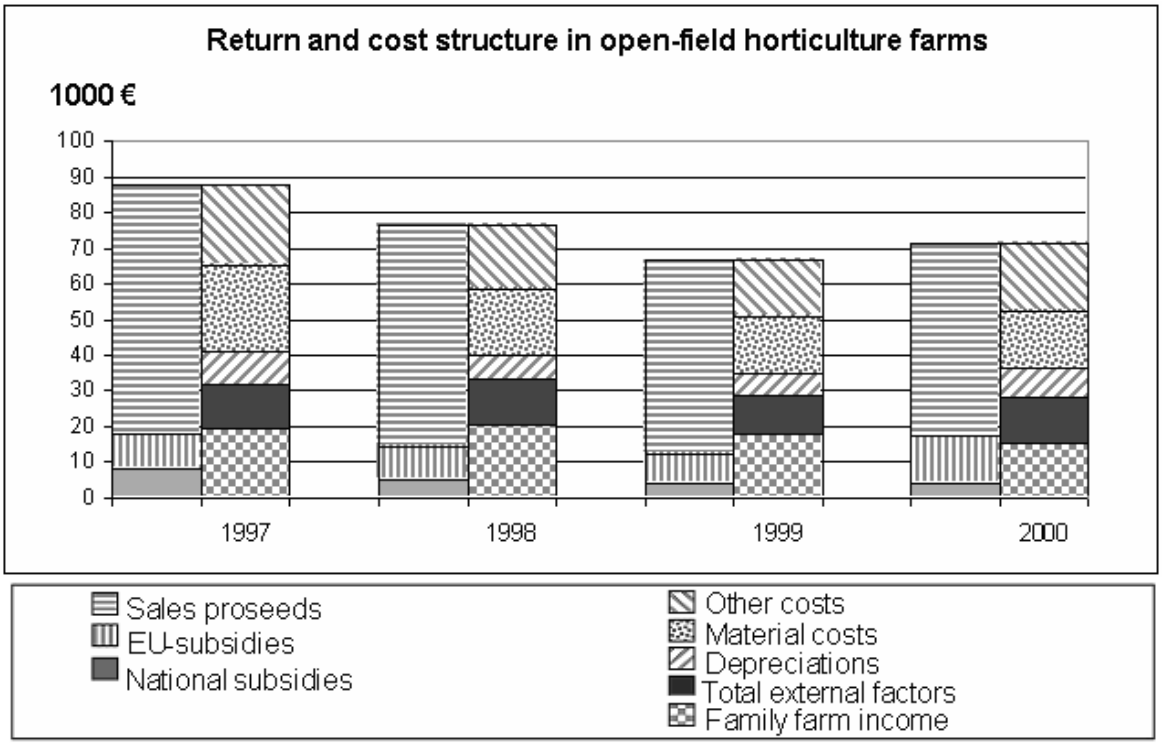


Figure 9. Return and cost structure of open-field vegetable farms in the AB support area in 1992-2003e. (Statistics Finland, MTT:MYTT data).

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