Finnish Agriculture
and Rural Industries 2010

Report drawn up by:

Ahlstedt, Jaana	(layout, editor)
Jansik, Csaba	(chapter 2.5)
Karhula, Timo	(chapter 4.1)
Knuuttila, Marja	(chapter 1.1)
Koikkalainen, Kauko	(chapter 5)
Koivisto, Anu	(chapter 2.4)
Miettinen, Antti	(chapter 5)
Myyrä, Sami	(chapter 4.2)
Niemi, Jarkko	(chapter 2.3)
Niemi, Jyrki	(chapter 2.1, 2.5, 3, summary, editor)
Rantala, Olli	(chapter 4.3)
Rantamäki-Lahtinen, Leena	(chapter 1.2)
Tauriainen, Jukka	(chapter 4.3)
Tuomisto, Jussi	(chapter 2.2)
Turunen, Harri	(chapter 4.1)
Vihinen, Hilkka	(chapter 6)
Voutilainen, Olli	(chapter 6)
Wuori, Olli	(chapter 6)
Väre, Minna	(chapter 1.3)

English translation by:

Kola, Jaana

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the picture has been cropped
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Artist and Professor *Pekka Halonen* (1865–1933) was one of the great masters of the 'Golden Era' of Finnish art. As a farmer's son he liked to paint honest and simple pictures of the life of peasants and ordinary people. One good example of his realistic outdoor paintings is his breakthrough work *Reapers* flooded with colour and light, which he painted in his home district Lapinlahti in summer 1891. In this picture of haymaking the man sharpening the scythe is Pekka Halonen's brother Antti. Pekka Halonen is known as a sensitive portrayer of Finnish winter landscapes and forests. This nature advocate and father of eight built his artist's villa in the peaceful countryside by Lake Tuusula. Today Pekka Halonen's home Halosenniemi is a very popular museum.

MTT
Taloustutkimus

JULKAISUJA 110a

Finnish Agriculture and Rural Industries 2010

Edited by
Jyrki Niemi and Jaana Ahlstedt

Maa- ja elintarviketalouden tutkimuskeskus
Agrifood Research Finland
Economic Research
PUBLICATIONS 110a

ISBN 978-951-687-153-3 (Printed version)
ISBN 978-951-687-154-0 (Electronic version)
ISSN-L 1798-5900
ISSN 1798-5897 (Printed version)
ISSN 1798-5900 (Electronic version)

Publisher
MTT Economic Research, Agrifood Research Finland,
Luutnantintie 13, 00410 Helsinki, Finland
www.mtt.fi

Sales and distribution
MTT Economic Research, Agrifood Research Finland,
Luutnantintie 13, 00410 Helsinki, Finland
Tel. +358 9 560 80, fax +358 9 563 1164
e-mail: julkaisut@mtt.fi

Printing
Vammalan Kirjapaino Oy 2010

Preface

The MTT Economic Research publishes annually a report on Finnish agriculture and rural industries. During its 30-year history the publication has offered an up-to-date information package on the agriculture and food sectors and, more broadly, on the countryside and rural economic activities to those with professional or other interest in these issues. This year's publication focuses on long-term trends in the agriculture and food sectors and rural issues during the past two decades, as well as looks into the future of the sectors after 2010.

In the agricultural policy reforms of the past decade the sector has been taken into a more market-oriented direction. This has opened the food market for international competition. For Finland this means that food imports have been growing rapidly in recent years, mainly from the internal market of the EU. At the same time, exports from Finland have not increased as much. In spring 2007 we experienced very strongly the risks of liberalised markets when the prices soared as a result of numerous, both short- and long-term factors. The following two years were quite a rollercoaster: the rapid increase in agricultural input prices was followed by a considerable decrease in the prices of agricultural products, which then led to a decrease in the input prices, but much more slowly. This was reflected as a serious income and profitability crisis among the producers. The sharp fluctuations in the prices and their consequences led to a more serious discussion than before on competition in the food chain, profitability of the different parts of the chain and pricing practices.

Structural change in Finnish agriculture has been rapid during the EU period. The number of farms has decreased by a third, farm size has grown and new technologies have substituted for old ones. The trend is expected to continue in 2010, i.e. Finnish foodstuffs are produced in larger production units by a diminishing number of farms and farmers. Our self-sufficiency in food has stayed quite high, meaning that Finland is still capable of producing most of the staple agricultural products. As regards agricultural inputs, however, Finland is by no means self-sufficient.

In the aftermath of the CAP health check the attention is being directed to the common agricultural policy after 2013. The work on anticipating policy changes gained pace during 2009. Even more of this anticipatory work will be done this year as the Commission gives a Communication on the budget frameworks for the next programming period. The trend is towards even greater market-orientation in the food sector. Instead of the income or production support, the future development and social acceptability of the common agricultural policy during the 2010 will be more strongly influenced by broader challenges, such as climate change mitigation, water protection, preservation of biodiversity and promoting renewable energies.

The special themes included in this publication deal with the impacts of climate change on agriculture and adaptation of the sector, responsibility dimensions in food production, change of the agricultural market, nutrient loading from agriculture and sustainable school meals. On behalf of the MTT I wish to thank Professor Jyrki Niemi and Research Secretary Jaana Ahlstedt, who edited the publication, and all the experts involved in the writing process.

Helsinki 1 March 2010

Pasi Rikkonen
Director
MTT Economic Research

Contents

Summary 5

1. Operating environment of agriculture 10
   1.1. Agriculture and food sector in the national economy 10
   1.2. Rural enterprises 16
   1.3. Finnish farm 20

2. Agricultural and food market 24
   2.1. Trends on the world market 24
   2.2. Arable crops 25
   2.3. Livestock production 32
   2.4. Horticultural production 37
   2.5. Food market 41

3. Agricultural policy 48
   3.1. Common agricultural policy of the EU 48
   3.2. National aid 52

4. Economic situation of agriculture 56
   4.1. Agricultural income 56
   4.2. Productivity development in agriculture 57
   4.3. Profitability development of agriculture and horticulture enterprises 59

5. Agriculture and the environment 64
   5.1. Environmental impacts of agriculture 64
   5.2. Agri-environment regulation 67
   5.3. Agri-environment payments in 2007–2013 67
   5.4. Water protection 69
   5.5. Main topics and future perspectives 70

6. Rural and regional policy 75
   6.1. Changes in Finnish rural areas 75
   6.2. Finnish rural policy 76
   6.3. Rural Policy Programme and its role in Finnish rural policy 78
   6.4. Socioeconomic role of agriculture in rural areas 81
   6.5. Resources of the countryside 83

Appendices 88

Special topics

Seven dimensions of responsibility in food production 14
Climate change takes Finnish plant production to a new era 30
Cereal and oilseed sectors in transition – are markets overruling policies? 54
Great challenges in the manure management 73
Municipal catering services, school meals and sustainable food supply 84

SUMMARY – First 15 years in the EU for Finnish agriculture and food economy

The operating environment of Finnish agriculture and food economy changed radically when Finland joined the EU in 1995 and the sectors became subject to the market and guidance instruments of the common agricultural policy. The commitment to the common agricultural policy led to sudden and unforeseeable change in the operating environment of agriculture and food sectors. Instead of administrative guidance, after the accession the food chain was more strongly steered by the markets. The market price levels of agricultural products could no longer be regulated by means of national border protection and export subsidies.

The minimum prices for agricultural products in the EU were much lower than the producer prices in Finland, which used to be guaranteed by Agricultural Income Acts. The variations in the producer prices increased as well. Due to the free imports and exports between the EU countries the Finnish agriculture and food industry had to learn to operate according to the needs arising on the markets.

Competitiveness of agriculture tested

The change in the operating environment highlighted the need to improve the competitiveness of Finnish agriculture and food industry. The transition from an economy with closed markets to open and competitive markets was not easy to realise in a short notice.

The preconditions for agriculture are much weaker in Finland than in the more southern EU countries. The growing season is shorter and effective temperature sum is much lower than in Central Europe.

The adverse natural conditions are the most clearly reflected in the yield levels: our cereal yields, for example, are only about a half of those harvested in Central Europe. The unfavourable structure of agriculture is also a burden for its competitiveness. Because of the large surface area and sparse population, maintaining the population of the rural areas is far more problematic than in the other Member States.

Even in the EU context, however, the market environment faced by agriculture has not been completely open for competition. Agriculture practised in adverse conditions is supported in the EU, partly based on social and rural policy. Production in mountain and less-favoured regions is maintained by means of specific support schemes. Keeping the rural areas populated is an important objective, for both Finland and the EU.

Central role of agricultural support

The national objectives of agricultural policy are founded on the compensation of the permanent competitive handicap of Finnish agriculture due to the adverse natural conditions so that our production can succeed on the common European market. Efforts to this end have been made by developing the common agricultural policy to take the needs of Finland better into account and through national measures allowed by the conditions of accession.

When Finland joined the EU, the producer price level fell by 40–50% right in the beginning of 1995. The reduction in the input prices was not sufficient to compensate for the decrease in the total return, which is why it has been necessary to compensate for lower producer prices and disadvantages due to the natural conditions through various support payments.

Support payments to agriculture as well as their characteristics and amounts have a central role in maintaining the preconditions for competition in different parts of

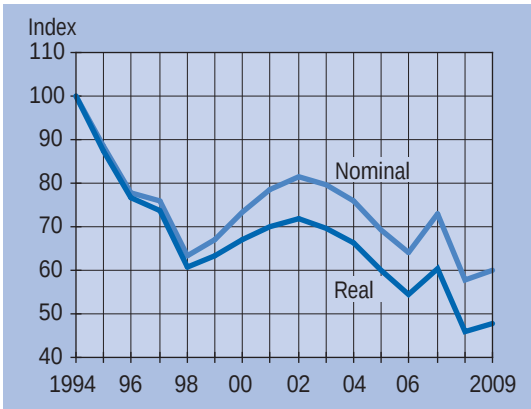
Support funded and part-funded by the EU in Finland, € million.

	2008	2009prelim.	2010estimate
EU funded			
CAP income support	557	555	545
EU part-funded			
Natural handicap payments	421	420	422
Agri-environment payments	330	350	374
National aid			
Northern aid	327	328	336
National aid for southern Finland	94	90	87
National top-ups to LFA support	119	119	119
Other national aid	15	16	23
Total	1,863	1,878	1,906
EU contributions	767	771	767
National payments	1,096	1,107	1,139

the country and production sectors. Support payments are much more significant in the income formation of agriculture in Finland than in the other EU countries.

In 2009 the support payments totalled € 1.9 billion, representing 43% of the total return on agriculture and horticulture (€ 4.3 billion). Before the accession to the EU the share of direct payments in the return was less than a fifth.

Despite the growth in support payments, agricultural income has decreased to a total of € 845 million in 2009. At fixed prices the agricultural income of 2009 was only a half of the level before the accession.



Development of agricultural income in Finland in 1994–2009.

Instead, the total return on horticulture and entrepreneurial income have grown. Since 1995 both the total return on horticulture and horticultural income have increased by more than 40%.

Rapid structural development

The structure of Finnish agriculture has changed quite dramatically in recent years. Before the accession to the EU there were more than 100,000 farms in Finland but now, 15 years later, there are less than 64,000 farms left. The number of farms has decreased by about 3% a year, in the livestock sector even more rapidly. For example, the number of farms specialised in milk production has decreased by almost 7% a year.

The continuous decrease in the number of farms and jobs in primary production has stressed the role of other rural industries and economic activities as employers. Every third Finnish farm is diversified, i.e. practises some other entrepreneurial activity besides agriculture and farm forestry.

As the number of farms has decreased, their average size has grown. In 1995–2009 the average size of active farms grew by 54% from 23 ha of arable land to almost 35 ha. About

Number of active farms and agricultural income in 1994–2009.

	Number of farms	Change from previous year %	Change from 1994 %	Agricultural income at 2009 prices, € million	Index 1992–94 average: 100
2009	63,716	–2.4	–38	845	52
2008	65,292	–2.3	–37	814	50
2007	66,821	–2.8	–35	1,070	66
2006	68,766	–0.5	–33	964	60
2005	69,088	–2.8	–33	1,059	65
2004	71,100	–1.3	–31	1,172	72
2003	72,000	–1.9	–30	1,229	76
2002	73,386	–2.7	–29	1,271	78
2001	75,384	–3.2	–27	1,239	76
2000	77,896	–5.2	–24	1,188	73
1999	82,142	–4.1	–20	1,121	69
1998	85,690	–3.0	–17	1,073	66
1997	88,370	–3.2	–14	1,304	80
1996	91,281	–4.5	–11	1,353	84
1995	95,562	–7.2	–7	1,549	96
1994	103,000[1]			1,769	109

[1] Estimate of the MTT Economic Research, Agrifood Research Finland
Sources: Total calculation of the MTT Economic Research, Agrifood Research Finland, Support register of the Ministry of Agriculture and Forestry (MMM).

two-thirds of the increase in the farm size has taken place through leasing arable land. In 2009 about 35% (792,000 ha) of the little under 2.3 million ha of arable lands cultivated by active farms was leased, while in 1995 the share of leased area was 22%.

Structural change has led to a positive development in the productivity of agriculture. In 2009 the same amount of inputs yielded almost 21% more output than in 1992. On average the productivity of agriculture grew by 1.15% a year.

Growth in cereal area

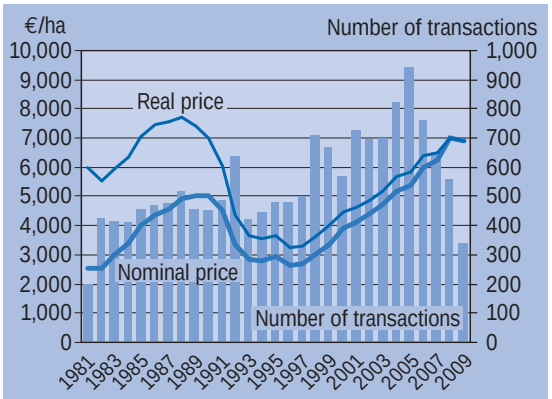
The changes in the structure of agriculture have been reflected in the use of arable land. The decrease in the number of cattle farms has led to a fall in the grass area from 754,600 ha in 1995 to less than 630,000 ha in 2009.

During the EU period the cereal cultivation area has, in turn, risen to the same level as after the mid-1980s. The cereal area was 978,000 ha in 1995 and 1,270,000 ha in 2009. The area under bread cereals, in particular, has grown all through the EU period, and the area of spring wheat has more than doubled since 1995. The main reasons behind the growth are changes in support payments for the crop sector, trends in market prices and change in the production structure of farms.

Cereal trade has also changed considerably in the past 15 years. Market-orientation has become increasingly important and the farmers also follow the markets much more than before.

Price of arable land still high

The price of arable land rose very strongly all through the 1980s, reaching its peak at the end of the decade and early 1990s. After that the prices fell rapidly due to the general economic situation and threat that the possible EU membership was seen to pose to Finnish agriculture. In 1993–



Trends in real and nominal price of arable land and annual land sales in 1981–2009.

1997 the average price of arable land in the whole country stayed around € 3,000. After that the price has again been rising quite rapidly.

The price of arable land varies considerably between the different parts of the country. The highest prices were paid in the regions of Varsinais-Suomi, Satakunta and Ostrobothnia in south-western and western Finland, while the price was the lowest in Lapland, Kainuu and South-Savo, i.e. in the north and east.

Export and import of dairy products

In the first years of the EU period the production of dairy milk fell by 1–2% a year. In 1997–1998, however, the volumes started to rise again, reaching a new peak level in 2001. Since then the production has decreased by 7%. In 2009 there were only about 12,000 milk producers left, which is 65% less than in 1994. At the same time the average herd size has increased from 12 to about 25 cows.

The consumption of dairy products has shifted to lower-fat products. In 1995–2009 the total consumption of liquid milk fell by 7% and that of butter by 42%, while the consumption of cheeses grew by 41%.

In the foreign trade during the EU period the imports of cheese and yoghurt to Finland and exports of butter from Finland have grown the most. Cheese is imported mainly from Denmark, Germany and Poland. The share of imports in cheese consumption has risen to almost 40% and in yoghurt consumption to 24%.

Already about a half of the fat contained in milk produced in Finland is used for the manufacture of export products. Of the butter, for example, only a third is consumed in Finland.

Record levels in meat production

In 2009 a total of 384 mill. kg of meat was produced in Finland. This is about 25% more than in 1995. The production of poultry meat has increased by as much as 124% during the EU period. Turkey meat production has grown the most, almost seven-fold, but the impact in total volumes is quite small as 90% of the poultry meat produced in Finland is broiler meat. Broiler meat consumption has also grown very strongly so that in 2009 it was 90% higher than in 1995.

Pigmeat production grew by about 20% in 1995–2009. Most of this went to export. In 2009 the pigmeat exports were about six times those in 1995.

Instead, in the past 15 years Finland's self-sufficiency in beef has fallen from more than 100% to about 84%. In 2009 beef production volumes in Finland were 16% smaller than in 1995.

Egg production fell especially in the first years of the EU period so that already in 1999 the volume was 27% smaller than in 1995. Egg consumption has decreased by about 16% since 1995.

Food with less work

When the trend in food prices is considered in the long term, it has followed quite closely the rise in the general trend in consumer prices. Between 1995 and 2009 the food prices in nominal terms rose by

28%. During the same period the general consumer price index rose by 25%, which means that in real terms the food prices are quite close to the level of 1995.

For an average wage earner the food prices have fallen clearly during the EU period, because the wages have risen by more than 65% in the past 15 years. In 1995 it took four hours of labour to fill a certain food basket, but in 2008 the amount of money needed for this could be earned in three hours.

The share of food and non-alcoholic beverages consumed at home in the consumer expenditure of households has decreased by three percentage units from 1995 to 12.4%, which is close to the average level in the EU-15.

Besides the trend in food prices, in recent years the public discussion has centred around the distribution of the price paid by the consumer within the food chain. Studies have shown that the share of trade in the consumer prices of food including tax has increased during the EU period. The position of trade has strengthened as it has taken advantage of competitive tendering among food industry and primary production, with stricter terms than before.

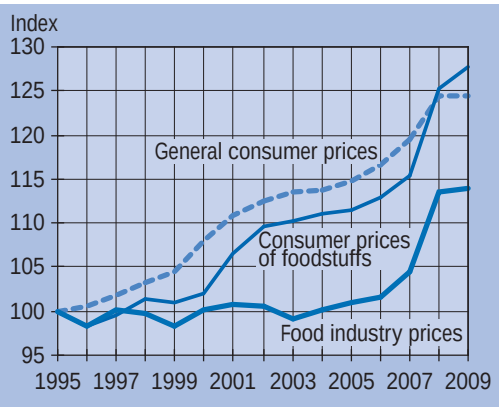
In the retail trade in food significant reorganisations have taken place among the major chains. The competitive situation is to a growing extent a case between the two big ones, i.e. the K and S Groups. The concentration of the sales is reflected both in the market shares of the leading chains and in the steep decrease in the number of retail outlets. Year by year the largest food stores take over growing shares of the food sales.

Growing market and price risks in the food chain

In the past few years we have seen rapid changes on the international agricultural product market. Sudden and dramatic price fluctuations have take all parties to the market by surprise. The rise in the world market prices was exceptionally strong in 2007 and early part of 2008, but this was soon followed by an equally dramatic drop in the latter part of 2008.

Strong variations in the supply of agricultural products as well as the resulting great price variations have come to stay. Any indications of changes in crop outlook are rapidly reflected in the world market prices. Climate changes increases the variations in the weather conditions and extreme weather events. Within Europe price variations of agricultural products will be growing simply because the EU market interventions which used to function as safety nets have been reduced, and further action to this end will be taken in the future.

All this means higher market risks in the food sector both in the product sales and raw material purchases. At the same time the responsibility for managing the risks is shifting more and more from the State to the markets and companies operating on them. More attention needs to be directed in the food chain to the management and control of the growing market and price risks. In view of the rapidly changing markets, all stakeholders need to develop their own actions so as to protect themselves against the risks and thus ensure the continuity of their operations.



Trends in the food industry prices, consumer prices for food and general consumer prices in 1995–2009.

1. OPERATING ENVIRONMENT OF AGRICULTURE

1.1. Agriculture and food sector in the national economy

In Finland the total annual consumer expenditure on food and beverages is about € 20.1 billion. The share of food and non-alcoholic beverages consumed at home is a little over a half of this, (€ 11.4 billion). Since 1995 the share of food and alcoholic beverages consumed at home in the consumer expenditure of households has decreased by three percentage units to 12.4%, which is about the same as in the old EU countries. When alcoholic beverages and eating out are included, food represents about 22% of the consumer expenditure of households. The share of food consumed outside home is 6.1%, which is lower than in the old EU countries (7.4%).

The total value of the annual money flows in the food sector is about € 24 billion, when food exports and agricultural support payments are taken into account, in addition to the total private and public consumer expenditure. This is about 13% of the Finnish GDP.

Agriculture and horticulture

According to the national accounting, the gross value of agricultural and horticultural production is about € 6.5 billion, when production support of 2.2 billion is taken into account. The value added produced by agriculture and horticulture to the Finnish GDP fell from 3% in 1995 to 1.8% in 2008. Agriculture and horticulture suffer the most from the adverse natural conditions and thus they are not capable of competing with production in other sectors.

Agriculture is a capital-intensive sector. Even if the share of agriculture in total investments has decreased slightly since 1995, it is still 3%, which is clearly higher than its share in the GDP.

Besides the investment goods, the production involves intermediate products from other sectors, such as energy, fertilisers, feedingstuffs and services of the trade sector, with a total value of € 3.5 billion.

Consumer expenditure on foodstuffs and beverages, € million.

	2007	2008	% change
Total	18,713	20,052	7
Foodstuffs*	9,474	10,399	10
Non-alcoholic beverages*	950	984	4
Alcoholic beverages*	2,904	3,081	6
Catering services (eating out)	5,385	5,588	4

**Food consumed at home*
Source: Statistics Finland, National accounting.

Share of foodstuffs and non-alcoholic beverages in consumer expenditure of households, %.

	1995	2008
EU 27	14.5	13.0
EU 15	13.9	12.3
Denmark	13.3	11.2
Estonia	31.9	19.6
Finland	15.4	12.4
France	14.9	13.4
Germany	12.3	11.4
Sweden	14.1	12.7
United Kingdom	11.1	8.9

Source: Eurostat, National accounts.

Food processing

The gross value of the production of food industry is € 10.6 billion. Since 1995 the GDP share of value added has decreased from 2.6% to 1.6%. The imports fulfil a growing share of the domestic demand and increase in exports has not compensated for this. The share of food industry in the value added of the industrial sector has decreased from 10% to 7%.

The share of investments in food industry of total investments has decreased from 2% to the current 1.1%, which is below the sector's GDP share.

Food industry is raw material intensive: intermediate products represent more than 70% of the gross value of the production. Food industry purchases most of its raw material from the domestic agriculture. Because of the transportation costs, a significant share of the food industry depends on domestic raw material. The share of imported products in the gross value of the production is about 11% (€ 1.2 billion).

Electronics industry has passed forest industry as the most significant industrial sector in Finland. Measured by both the gross value of the production and value added, food industry still ranks the fifth largest sector after these two as well as metal and machine industries.

Domestic trade in foodstuffs

The trade sector sees to the final distribution of foodstuffs to the consumers. The share of wholesale and retail trade in the GDP is estimated at about € 2.9 billion. The value of production in the trade sector is more difficult to estimate than that of primary production and processing because, in addition to foodstuffs, the trade sector includes other perishable and durable goods.

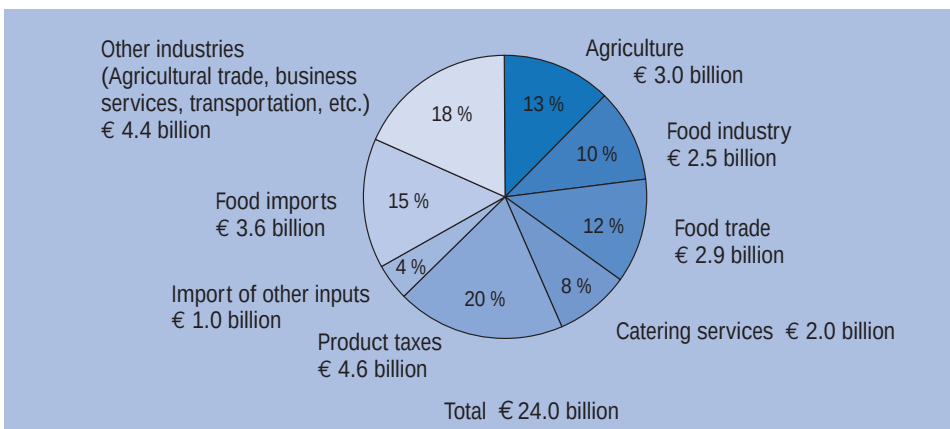
Foodstuffs require more handling, which is why wages and salaries constitute a significant item in the value added of the trade sector. Other major cost items are transportation and logistics and various kinds of business and real estate services.

The position of trade at the end of the food chain differs from primary production and processing. The trade sector is not dependent on domestic primary production in the same way as the food industry, and thus it is capable of taking advantage of competition, both within the domestic food industry and between the Finnish and foreign companies.

Food trade is still largely in the hands of domestic operators, founded on chains of wholesalers and retailers, where the buying-in operations both in Finland and abroad are highly centralised. Besides the German discount chain Lidl, the small markets and high transportation costs have not attracted any other foreign food chains.

Foreign trade in foodstuffs

In 2008 the value of food imports was about € 3.6 billion and the value of exports was € 1.4 billion. The economic depression influenced the foreign trade in foodstuffs in 2009 so that both food imports and exports fell. The share of food imports



Estimated money flows in the Finnish food sector in 2008.

has been about 5% of the total value of imports, while food exports represent about 2% of total exports.

Besides the finished food products the food sector imports various inputs needed in the production, such as raw materials for processed foods and feedingstuffs, fuels and various kinds of chemicals, and most of the machinery and implements.

Some of the imported foods are primary products which cannot be produced in Finland (coffee, tea) or the quantities produced are not sufficient (fruit, vegetables). However, the share of similar products, such as cheeses, beverages and confectionary, in foreign trade has increased.

Taxes and support in the food sector

The State functions in the food chain as it collects taxes and allocates financial support to agriculture. In addition to the value added tax, the consumers pay excise duties on e.g. alcohol. The inputs used in the production contain e.g. excise duties on energy and fuel. Income tax is collected on wages and salaries and capital income.

In 2008 the value added tax and excise duties on foodstuffs and beverages totalled € 4.6 billion. The annual value added tax revenue on food totals about € 1.6 billion and that on alcoholic beverages € 0.5 billion. The value added tax of 22% collected on restaurant services brings a revenue of € 1.1 billion and the excise duty on alcoholic beverages about € 1 billion a year.

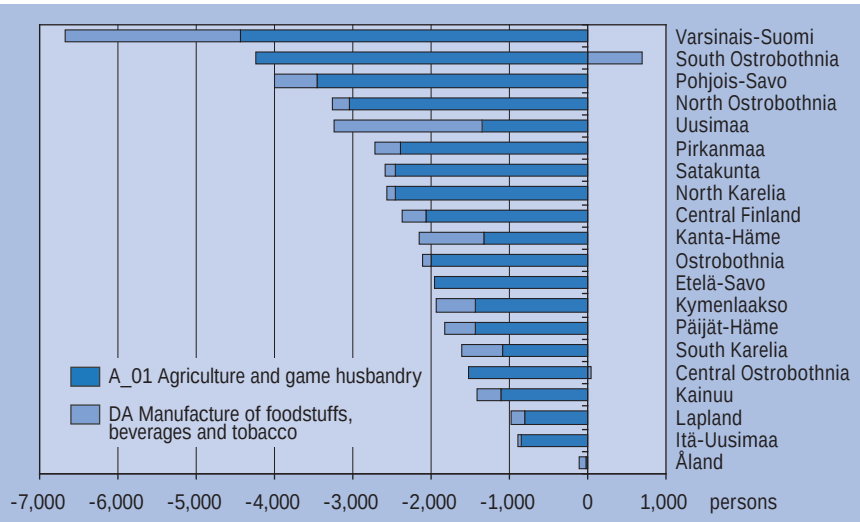
The quite high VAT on food compared to the rest of Europe, 17%, was lowered to 12% in October 2009, but in 2010 it rises to 13%. The VAT on restaurant services falls to the same 13% in July 2010.

The various types of support, a total of about € 2.2, billion are funded by the EU, co-funded by the EU and national funds or paid from the national funds only. The EU contributions total about € 0.8 billion.

Economy-wide effects of the food sector

Besides agriculture, food industry and the trade sector, various other sectors are involved in food production. In practice the effects of food production extend all through the economy, to the chemical and energy sectors and water and waste management.

The value added produced in the input



Change in the number of persons employed in agriculture and food industry by regions in 1995–2008. Source: Regional accounting, Statistics Finland.

demand of agriculture totals about € 1 billion. When food industry and trade and catering services are included, the value added created in the other sectors amounts to about € 4.4 billion.

Indirect effects of food production are also created in households through the use of income earned in food production for purchasing goods and services. In the rural areas such income effects may be even greater than those of input demand.

Part of the investment effects flow abroad, especially through the purchase of machinery. The effects of building are more directly directed to the regions themselves than investments in machinery.

Employment effects of the food chain

The number of people employed in agriculture fell by 50,000 from 1995 to about 90,000 persons in 2009, which is 3.7% of the employed labour force. The number of people employed in agriculture has fallen in all regions along with the number of farms and increased substitution of machines for labour. Proportionally the share of agriculture in the employed labour force is the highest in South and North Ostrobothnia, where it is more than 10%, and around Vaasa on the west coast and in Savo and North Karelia, more than 7%.

By purchasing production inputs agriculture employs about 20,000 persons in Finland. These jobs are mainly located in urban areas and population centres, not in the rural areas.

The number of persons employed in food industry has fallen by about 10,000 since 1995. The number has decreased in almost all regions of Finland, except for South and Central Ostrobothnia and South Savo. Food industry still employs about 35,000 Finns, proportionally the largest numbers in South and Central Ostrobothnia and Häme.

While the jobs in primary production and processing are decreasing, more people find employment in restaurants and catering services and in food trade. The number of people employed in restaurants and catering services grew by 20,400 from 1995 to 66,200 in 2008. Food trade employs more than 50,000 persons.

When the employment effect of all sectors is taken into account, the whole food sector employs almost 300,000 persons.

GDP share of agriculture[1] and food industry (at basic price) and investments (at current prices).

Year	010, 014 Agriculture and related services	DA Manufacture of foodstuffs, beverages and tobacco	010, 014 Agriculture and related services	DA Manufacture of foodstuffs, beverages and tobacco	Share in investments Agriculture and related services	Share in investments Manufacture of foodstuffs, beverages and tobacco
	million €	million €	%	%	%	%
2008	2,996	2,478	1.8	1.5	3.0	1.1
2007	3,249	2,427	2.0	1.5	3.3	1.2
2006	2,892	2,276	2.0	1.6	3.3	1.1
2005	2,918	2,350	2.1	1.7	3.4	1.3
2004	2,827	2,318	2.1	1.7	3.4	1.1
2003	2,875	2,395	2.3	1.9	3.9	1.5
2002	2,935	2,384	2.3	1.9	4.3	1.6
2001	2,924	2,231	2.4	1.8	3.8	1.4
2000	2,857	1,837	2.5	1.6	3.7	1.3

[1]Agriculture at factor price, including subsidies on products and subsidies on production.
Source: National accounting 2000–2008e, Statistics Finland.

Seven dimensions of responsibility in food production

Sari Forsman-Hugg[1], Juha-Matti Katajajuuri[1] and Johanna Mäkelä[2]

The discussion on responsibility in food production and consumption is spreading rapidly in Finland. Besides the principles of the matter, this should also involve a very concrete content and proven, everyday action. The food companies have a serious need to show that their actions are responsible and respond to the challenges posed by sustainability, from the perspective of the economic, environmental and social dimensions. Responsible food production is linked, on the one hand, to the corporate social responsibility of companies and production chains and, on the other hand, responsible food consumption. Like any other production process, food production impacts on the surrounding society in various ways. These impacts may be positive, such as the direct or indirect employment effects or product innovations that promote human health. However, food production also involves undesirable effects relating to, for example, climate change or eutrophication of waters. Responsibility is to a growing extent perceived as a new kind of earnings logic. Besides often being cost-efficient, investments in proactive and creative innovations that enhance responsibility in food production may create strategic competitive advantages to the operators.

Responsible food production should always be considered in interaction with responsible consumption. The most recent results of the EnviMat project show that eating represents 15 to 40% of the environmental impacts caused by private consumption, depending on the specific elements and environmental impacts that are included in the calculation. At the same time the interest of consumers in the impacts of the food choices they make has increased. There is not yet enough information neither the tools to interpret the information for assessing the responsibility of the various food choices made by the consumers. Many consumers know relatively little about the food production chain, which is why communicating on responsibility is a challenging task.

The seven brothers of responsibility

In a study by the MTT Agrifood Research Finland and the National Consumer Research Centre completed in 2009, responsibility in the food chain was summarised into seven dimensions: environment, product safety, nutrition, occupational welfare, animal welfare, local market presence and economic responsibility. The content of responsibility was constructed in cooperation with companies, interest groups and experts. The study was based on extensive sets of data on the responsibility issues in the production chains of certain case products. The idea was to include the entire value chain, lifecycle-based thinking and transparency and quantification of responsibility.

Environmental issues are a widely shared concern. From the perspective of the environment the most significant quantifiable problems concern the climate change and eutrophication of waters. It is important for the companies to know the environmental impacts of their own operations so that they can look for solutions to mitigate these. Environmental impacts of the product are created at all stages of the lifecycle, where the impact of primary production is the greatest. This means that the produc-

[1] *MTT Agrifood Research Finland*
[2] *National Consumer Research Centre*

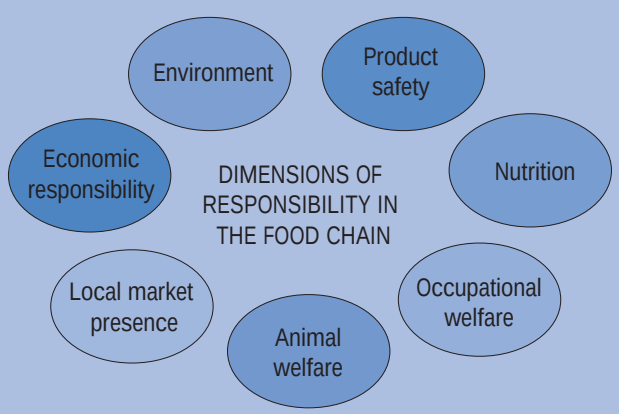
tion chain as a whole needs to be examined when assessing, developing and measuring responsible action.

Product safety is considered a major strength of Finnish food production and a central factor in maintaining consumer trust. From the perspective of responsibility, traceability of the products should be taken further than what is required by law. Many finished food products consist of several raw material chains, where the journey of a certain ingredient may have started from the other side of the earth. Besides transparency, more communication to the consumers would be needed on the good practices developed and applied for better food safety. In the food sector *nutritional responsibility* is also important and should also be taken into account in the strategic planning of companies and consumer information on the products.

The Finnish food chain employs more than 300,000 persons. What has received less attention is the *occupational welfare* of employees in the sector and their high professional skills and expertise. The *animal welfare* is a very particular responsibility dimension in the food sector. The consumers are showing a growing interest in animal welfare issues. Comprehensive indicators are needed for the monitoring of animal welfare which take better into account the health, care and treatment and living conditions of the animals. In Finland the *local market presence* could be better seen as part of the responsibility of business activities. In terms of responsibility it would be important to examine the impacts of a farm or company on local well-being and how the interaction between the local operating environment and the partners and stakeholders involved in it is constructed. *Economic responsibility* is the cornerstone of all business activity. The main issues are the economic impacts of food production on the different parties and transparency of price formation in the food chain.

Responsibility from farm to fork and back

In a very short time responsibility has become a denominator that offers various kinds of opportunities for structuring the practices and operations of the food chain from quite a new perspective. Behind food production there are various kinds of raw materials and other production inputs, people, processes and locations. When the feedback of side-processes of food production and its utilisation and further processing is linked to the food chain, the traditional, linear food chain expands into a multi-dimensional network of supply and information chains. Responsibility is not constructed from farm to fork alone, but also from fork to farm. The understanding of food production and consumption in this broader framework helps to identify new kinds of value chains and sustainable business operation models based on responsible action which are constructed upon these. Enhancing responsibility leads to constant improvement.



Dimensions of responsibility in the food chain.

1.2. Rural enterprises

Small rural enterprises can be divided into three groups: farms engaged in basic agricultural production and farm forestry, diversified farms with other business activities besides agriculture and farm forestry, and small rural enterprises with no connection to farms.

In 2007 there were an estimated 137,600 small rural enterprises, of which 33% were engaged in basic agriculture, 17% were diversified farms and 50% were other small enterprises. During the economic boom the number and relative share of other small rural enterprises increased slightly, but due to the economic recession more enterprises have closed down and the number of start-ups has decreased.

Diversified farms in Finland and Europe

In 2007 the number of farms practising other gainful activities besides agriculture was 23,200, which means that about 34% of the Finnish farms were diversified. Engaging in different kinds of activities has traditionally been common among farmers, but since the 1990s new kinds of operations have been started more than ever before.

In 2007 the number of diversified farms was the greatest in South Ostrobothnia and Southwest Finland (Varsinais-Suomi). Proportionally the number of diversified farms was the highest in Uusimaa (southernmost Finland), Lapland and the Åland Islands and the smallest in North Savo and North Ostrobothnia.

Starting other gainful activities is often connected to changes in the operating environment of farms, creating new demand for the products and services, while new challenges to agriculture may have encouraged the farm families to seek new sources of livelihood. New activities have been set up especially in the service sector, and in 2007 about 70% of the diversified farms offered some kinds of services.

In this context the service sector comprises e.g. rural tourism, contracting and transport and real estate services. Tourism and various other services are also quite common. In recent years especially the number of diversified farms engaged in the production of renewable energy has grown rapidly and energy production has become the largest industrial sector.

More than a third of the diversified farms practice more than one gainful activity besides agriculture. These are often connected to agriculture so that the farm equipment, buildings, land or products are used and the owner of the farm, the spouse, other family member or a partner in a farm company is involved in the other business. Of the diversified farms in Finland 79% are engaged in this kind of activity, using the same resources as agriculture. Most of

Rural enterprises in Finland in 2000–2007.

Year	2000	2002/2003	2004/2005	2007	Change 2000–2007, %
Total	136,400	130,400	131,500	137,600	1
Basic agriculture farms	58,000	50,150	45,200	45,000*	–22
Diversified farms	21,800	23,550	24,300	23,200	6
Enterprises with no link	56,600	56,700	62,000	69,400[e]	23

*[e] Preliminary estimate by MTT Economic Research, * incl. horticulture enterprises*
Source: Information Centre of the Ministry of Agriculture and Forestry MMM/Tike. Register of small rural enterprises (www.mtt.fi/pienyritysrekisteri).

these activities (65% of farms) were also taxed together with agriculture under the Agricultural Tax Act.

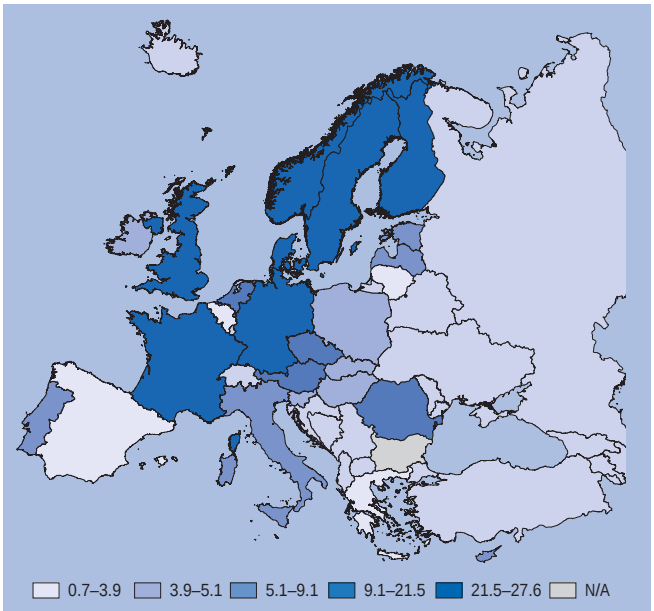
Other gainful activities on farms are usually quite small in scale. In 2007 their turnover was less than € 10,000 on about 40% of the farms. However, on 15% of these farms the turnover of other gainful activities was more than € 100,000. In 2007 employment in these other activities represented about 22,300 AWU. Most of the work was done by the farm families, but the role of hired labour has been growing. In 2000 the other gainful activities on farms employed 11,300 person outside the farm families, with a total labour input of about 3,100 AWU, while in five years their number grew to almost 15,000 persons and labour input to 7,600 AWU.

On the European scale statistics on diversified farms have only been kept since 2003. The statistics only include farms

Number of diversified farms in 2000, 2003, 2005 and 2007.

Sector	2000	2003	2005	2007
Diversified farms, total	21,838	23,551	24,295	23,179
Primary production other than agriculture and forestry	*744*	*1,328*	*1,815*	*1,505*
Fish, crayfish etc. farming on farms	112	102	64	120
Fur farming	632	647	510	505
Reindeer husbandry	*	423	574	471
Fishing	*	156	144	191
Other primary production	*	*	523	218
Industry	*4,786*	*4,140*	*3,753*	*4,774*
Food processing	1,065	846	684	620
Other further processing	134	78	152	140
Wood processing	1,349	1,134	889	1,122
Handicraft	274	337	277	413
Production of renewable energy	648	701	820	1,286
Peat production	311	267	217	286
Manufacturing of metal products	625	580	541	700
Other manufacturing	380	197	173	207
*Construction***	*	*697*	*881*	*1,043*
Trade	*1,056*	*1,234*	*1,299*	*1,299*
Services	*15,019*	*16,143*	*16,547*	*14,470*
Tourism, accommodation, recreation services	2,272	2,041	1,865	1,627
Contracting	8,880	9,039	10,013	8,539
Care services	263	249	234	309
Transportation	1,055	1,083	833	782
Services to business	*	736	680	661
Horse husbandry services (renting of stables, horse training)	*	717	734	882
Real estate maintenance, cleaning and environmental management services	*	*	264	190
Other services	2,549	2,278	1,924	1,480
Other	233	*	*	88

**Different classification of sectors, this sector not accounted for in the year concerned.*
***Clearing, demolition and groundwork building included in machine contracting.*
Source: Information Centre of the Ministry of Agriculture and Forestry.



Diversified farms in Europe in 2007, including farms where the same resources are used for agriculture and other gainful activities. Source: Eurostat.

where the agricultural resources and other gainful activities are closely linked to each other. In 2007 there were a total of 1.35 million diversified farms in Europe.

In recent years the relative share of diversified farms has grown in all parts of Europe. Within the EU about 10% of the farms are diversified. Relative to the total number of farms diversification is the most common in Northern and Western Europe, in particular, in Finland, Norway France and Great Britain.

Other small rural enterprises

There are regional differences in the number of small rural enterprises, which usually follows the general trends in the economy, and in their structural development. It is estimated that about a third of Finnish enterprises are located in the countryside. The number of enterprises has grown in rural heartland areas and urban-adjacent rural areas, while in the sparsely populated rural areas it has stayed about the same. The share of new enterprises is larger in rural heartland areas and urban-adjacent rural areas, which is why their average size is slightly smaller than that of enterprises in the remote rural areas.

In 2007 the number of small rural enterprises was estimated at about 69,000. Small enterprise means a company with one place of business with a turnover of at least € 8,409 which employs less than 20 persons. Their turnover totalled € 13.9 billion and they employed 112,900 persons (entrepreneur + staff). The following chapters present some of the most important rural industries and trends in these.

Rural tourism

Rural tourism is the part of the tourism industry where the opportunities largely derive from the natural resources of the countryside. The long-term development prospects of rural tourism are most favourable. The total number of rural tourism enterprises is estimated at 4,900 and their total turnover is about € 510 million.

The classification of the accommodation facilities of rural tourism enterprises was started in the early 1990s. In 1994 the number of rural enterprises with classified facilities was 90, and by 2007 their number had grown to 1,700. The number of classified cottages and holiday homes was about 2,700 and that of rooms or apartments was 1,550.

Equine industry

Equine industry is one of the most rapidly growing businesses in the rural areas. The annual money flows in the industry are estimated at more than € 700 million and it

is estimated to employ 15,000–16,000 persons. In this context equine industry comprises the breeding and rearing of horses and care services for them, training, riding schools and horse-related tourism.

About 75% of the enterprise in equine industry takes place on farms and 17% otherwise in the countryside. The total number of stables in Finland is about 15,000, of which about a quarter are companies. In 1995 there were about 55,000 horses in Finland, and by 2009 their number had grown to about 75,000.

Trotting is a very popular sport in Finland. Almost 9,000 horses start off each year at trotting races and the annual turnover of betting in horse races is over € 200 million. Each year about 800,000 spectators come to see the races at trotting tracks and the annual number of viewers at off-track betting points is almost 900,000.

The number of riding schools and leisure riding stables approved by the Equestrian Federation of Finland is about 300. There are a total of about one thousand riding stables, of which about a half are enterprises that may be considered riding schools. About 150,000 people enjoy riding as a hobby. The membership of the Equestrian Federation of Finland doubled in 1997–2009.

Energy production and bioenergy

The resources available in the countryside have an increasingly important role in the production of bioenergy and other renewable energy. Bioenergy is derived from biomass growing in forests, mires and fields as well as from organic solid, liquid and gaseous biowaste suitable for energy production from communities, agriculture and industry. Bioenergy, including wood, peat and recycled fuels, represents a little over 25% of the total energy consumption in Finland.

Most of the bioenergy produced and used on farms consists of chips or fuelwood from forests. The most important energy crop in agriculture is reed canary grass.

In 2007 about 200 farms were engaged in bioenergy contracting, which comprises the production of biodiesel, ethanol and biogas. Measured by turnover, bioenergy contracting was the most important activity on 30 of these. In 2008 the total number of SMEs that practised bioenergy production was 460. The field employed a little less than 4,000 persons, and this is expected to grow in the future especially in activities related to forest bioenergy. According to the long-term Climate and Energy Strategy, the use of bioenergy in Finland should increase by 28 TWh by 2020.

Reindeer herding

Reindeer herding is a highly significant business in the sparsely populated rural areas in northern Finland. It is a source of livelihood as such, and it is also significant in terms of the image of tourism and the Lappish culture. The greatest strength is the main product itself, i.e. reindeer meat, which is a widely desired special foodstuff. At present the supply of reindeer meat is not sufficient to meet the demand

In the reindeer herding year 1994/95 the number of reindeer owners was about 7,200 and in 2006/2007 it was about 4,900. The structure of the industry has changed as the number of herders has decreased and the herd size has grown. About 21% of the reindeer are now in small units with less than 80 animals, while households with over 200 reindeer represent 5% of all herder households and they own 31% of the reindeer.

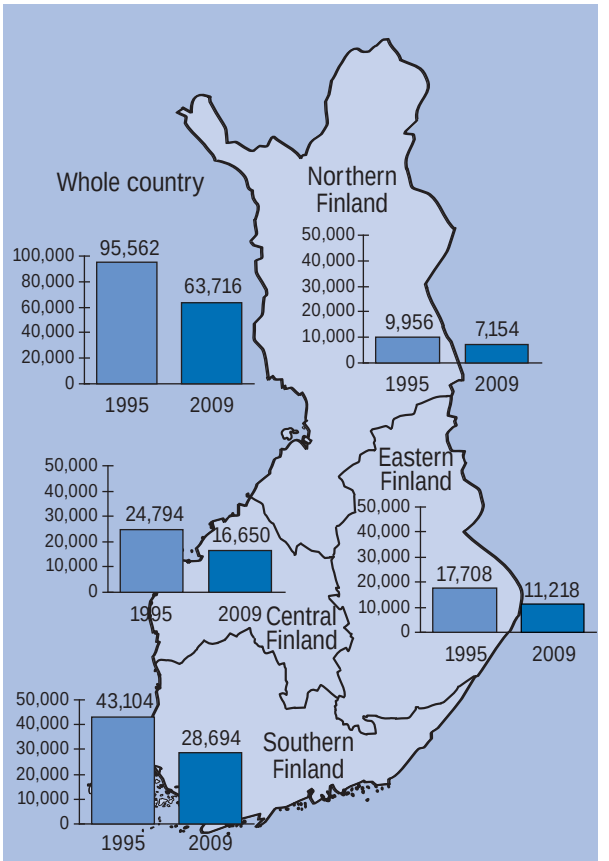
The number of reindeer has stayed about the same during the past decade. In 2005/2006 the number of reindeer totalled about 201,000, of which 124,000 were slaughtered. In recent years the production of reindeer meat has totalled 2.3–2.8 million kg.

1.3. Finnish farm

Number and size distribution of farms

In 2009 the total number of farms (over 1 ha) which had applied for agricultural support was a little over 63,700. During the fourteen years in the EU (1995–2009) the number of Finnish farms had fallen by more than 33% from 95,562 farms in 1995 by a total of about 31,846 farms. On average the number of farms has decreased at a rate of 2.9% a year. Proportionally the decrease has been the greatest in eastern Finland (37%) and the smallest in northern Finland (28%). In both southern and central Finland (33%) the number of farms has fallen less than in eastern Finland.

From 2008 until 2009 the number of farms which applied for support fell by about 1,600 (2.4%). In both absolute and relative terms the decrease in the number of farms was close to the long-term average. The number of farms fell the most in 1995–1996 and 1999–2000, when about 5% of the farms (4,000 farms) quit their production.



Number of farms receiving agricultural support in 1995 and 2009 (main regions of Uusimaa and Åland according to NUTS II have been included in Southern Finland). Source: Information Centre of the Ministry of Agriculture and Forestry, Rural Business Register.

While the number of farms is decreasing, the average farm size has been growing. The average size of farms receiving agricultural support has grown by 53.7% from 22.8 ha of arable land to almost 35 ha. The annual growth in the average size has varied from 0.5 ha to 1.5 ha. The growth is due to both the decrease in the

Number of farms receiving agricultural support in 1999–2009.

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Whole country	82,142	77,896	75,384	73,386	72,000	71,100	69,088	68,766	66,821	65,292	63,716
Southern Finland[1]	37,037	35,319	34,192	33,375	32,771	32,245	31,272	30,967	29,945	29,368	28,694
Eastern Finland	14,658	13,675	13,219	12,935	12,630	12,498	12,121	12,173	11,812	11,501	11,218
Central Finland	21,108	20,019	19,443	19,023	18,656	18,458	17,986	17,947	17,574	17,119	16,650
Northern Finland	9,339	8,883	8,530	8,053	7,943	7,899	7,709	7,679	7,490	7,304	7,154

[1] Main regions of Uusimaa and Åland according to NUTS II have been included in Southern Finland.
Source: Information Centre of the Ministry of Agriculture and Forestry, Rural Business Register.

Size class distribution and average arable area of farms receiving agricultural support in 2009[1].

Arable land	Southern Finland[2]		Eastern Finland		Central Finland		Northern Finland		Whole country 1995		Whole country 2009	
	Number of farms	%	Number of farms	%	Number of farms	%	Number of farms	%	Number of farms	%	Number of farms	%
< 10 ha	5,257	18	2,684	24	3,420	21	1,531	21	22,850	24	12,892	20
10–20 ha	5,751	20	2,676	24	3,881	23	1,377	19	30,698	32	13,685	22
20–30 ha	4,418	15	1,848	17	2,754	17	1,031	14	19,669	21	10,051	16
30–50 ha	5,614	20	2,055	18	3,222	19	1,412	20	15,414	16	12,303	19
50–100 ha	5,407	19	1,535	14	2,585	16	1,334	19	5,706	6	10,861	17
> 100 ha	2,083	7	366	3	681	4	436	6	784	1	3,566	6
Number of farms	28,530		11,164		16,543		7,121		95,121		63,358	
Average arable area, ha/farm	38.26		29.67		33.20		32.84		22.77		34.99	

[1] The figures do not include horticultural enterprises if they have no fields under cultivation.
[2] Main regions of Uusimaa and Åland according to NUTS II have been included in Southern Finland.
Source: Information Centre of the Ministry of Agriculture and Forestry, Rural Business Register.

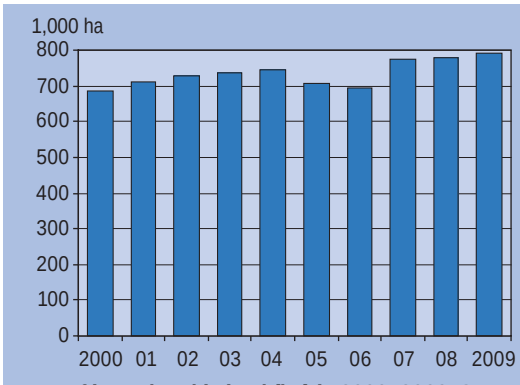
number of small farms and increase in the number of large farms.

The structural change is reflected in the proportional share of the different size categories: in the past fourteen years the share of farms with less than 20 ha has fallen from 56% to 42% and the share of farms with more than 50 ha has more than tripled from 7% to 23%. Despite the growth in the average size, however, the share of small farms is still high in Finland. Very large farms with more than 100 ha of arable land represent about 6% of the Finnish farms.

About two-thirds of the growth in the farm size in 1995–2009 has occurred through leasing. In 2009 the total cultivated arable area of farms receiving agricultural support was 2.278 million ha, and about 792,000 ha (35%) of this was leased. In 1995 the share of leased area was 22%. In 2005 and 2006 the leased arable area fell from the previous years, but since then it has again been growing. There is considerable regional variation in the leased area: in the territory of the Lapland and Åland Employment and Economic Development Centres more than 45% of the arable area is leased, while in some regions in southern and central Finland and Ostrobothnia the share of the leased area is less than 33%.

Despite the growth in the farm size, the efficient utilisation of machinery still suffers from, the small size of parcels, among other things. In 2009 the average size of base parcels was 2.42 ha. It varied from over 3 ha in southern Finland to less than 2 ha in eastern and northern Finland.

Finnish agriculture is almost exclusively based on family farms: in 2009 88.4% of farms receiving support were privately owned and 10.4% were owned by heirs



Area of leased arable land (ha) in 2000–2009. Source: Information Centre of the Ministry of Agriculture and Forestry, Rural Business Register.

and family companies and corporations. Cooperatives, limited companies and production rings owned 0.9% of the farms and 0.1% were owned by the State, municipalities, schools and parishes.

The average age of farmers on farms receiving agricultural support is 51.1 years. Since 1995 the average age of farmers has risen by about three years, mainly as a result of the small number of farms transferred to the next generation.

Production structure of farms

The production structure of Finnish agriculture has changed considerably during the EU membership. The number and share of livestock farms has fallen while the share of crop farms has increased clearly. In 2009 29% of the farms which applied for support were livestock farms and 65% were crop farms, while in 1995 the share of livestock farms was 52% and that of crop farms was 39%. However, the share of livestock production in the return on agricultural production at market price has in fact grown to about 82% in 2009.

In 2009 about 12,000 farms practised dairy husbandry as their main activity. This is 19% of the farms that applied for agricultural support. In 1995–2009 the number of dairy farms fell by more than 20,000 farms, at a rate of about 6.9% a year. Measured by the total value of the production, dairy husbandry is still the most significant agricultural production sector in Finland. In recent years milk has accounted for about half of the return on agricultural production at market price (47% in 2009). Proportionally the share of dairy farms is the greatest in eastern and northern Finland (31% of all farms). Dairy farms are more evenly distributed to all regions of Finland than the other sectors.

In 2009 the number of farms specialising in pig husbandry was about 2,240, which is about 3.4% of the farms that applied for support. Of the pig farms 727 specialised in piglet production, 731 farms specialised in pigmeat and 781 farms practised combined pig production. In 1995–2009 the number of pig farms fell by 64%, i.e. 7.1% per year. Most of the pigmeat production is located in southern and western Finland. Pigmeat represents about 15% of the return on agricultural production at market price. In terms of the value of the production it is the second most important agricultural product after milk.

In 2009 about 3,930 farms (6.2% of all farms) specialised in beef production, and the share of beef in the value of agricultural production was about 11%. In 1995–2009 the number of these farms fell by about 5,000, at a rate of about 5.8% per year. The number of beef farms fell the most during the first years in the EU. The distribution of beef farms across the country is quite similar to the regional distribution of dairy farms.

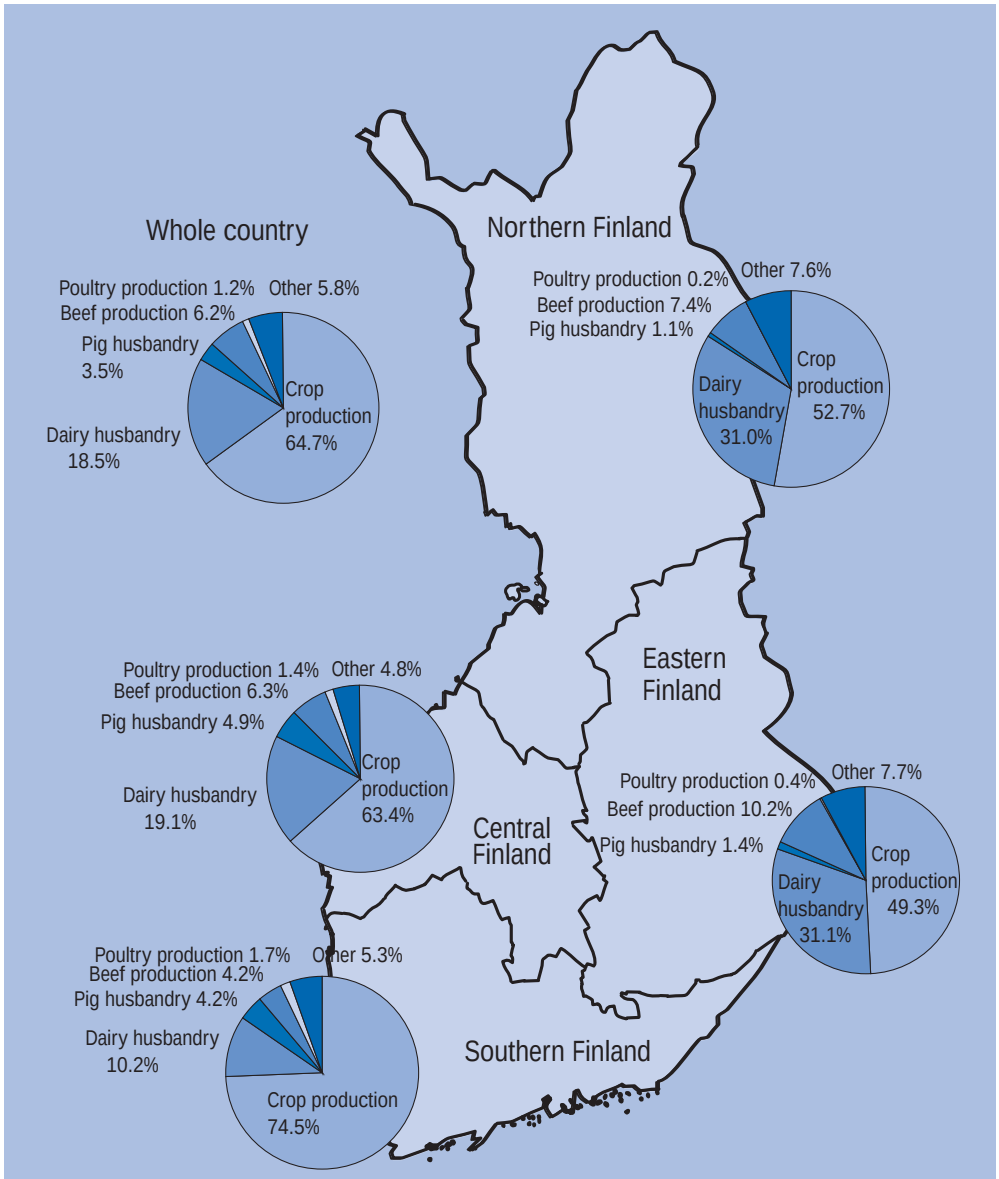
The number of poultry farms was 769, which is about 1.2% of the farms that applied for support. During the EU period the number of poultry farms has decreased the most, by a total of 65%, i.e. about 7.2% per year. The number of farms specialised in egg production has decreased the most. Even if the number of poultry meat farms has again turned to a decrease, their relative share of poultry farms has grown. In 2009 about 57% of poultry farms specialised in egg production, 30% in poultry meat production and 13% were breeding units. In 2000 the respective shares were 68%, 21% and 12%. Most of the poultry farms are located in southern and western Finland.

In 2009 there were about 41,200 crop farms, which is almost 4,000 more than in 1995. In 2009 the share of crop production in the return on agricultural production at market price was almost 18%.

The number and share of crop farms has grown the most in eastern and northern Finland. Instead, in southern and last year also in central Finland the number of crop farms turned into a decrease. More than half of the crop farms are located in southern Finland and about a quarter are

in central Finland, which means that now the total number of crop farms has started to decrease as well. The location of crop farms in different parts of the country is quite close to the regional distribution of all farms.

Forest is an integral part of Finnish farms. In 2009 the average forest area of farms receiving agricultural support was 49 ha. Regional variation is great: in Southwest Finland (Varsinais-Suomi) the average forest area of farms is less than 30 ha, while in Lapland it is about 105 ha. The income from forestry per farm is the highest in South Savo in central Finland and lowest in the Province of Åland.



Distribution of farms receiving agricultural support according to production line in 2009 (main regions of Uusimaa and Åland according to NUTS II have been included in Southern Finland). Source: Information Centre of the Ministry of Agriculture and Forestry, Rural Business Register.

2. AGRICULTURAL AND FOOD MARKET

2.1. Trends on the world market

In the past few years we have seen rapid changes on the international agricultural product market. The great and sudden rises in agricultural product prices have taken all parties on the market by surprise.

The rise in the world market prices in 2007–2008 was quite exceptional. The rapid rise was followed by an equally dramatic drop during the latter part of 2008.

The changes are founded on both random and structural causes. A major share of the sudden and dramatic changes were due to variations in the yields caused by exceptional weather conditions in important agricultural regions and the global economic crisis. The strong variations in oil prices were also reflected in the world prices of agricultural products.

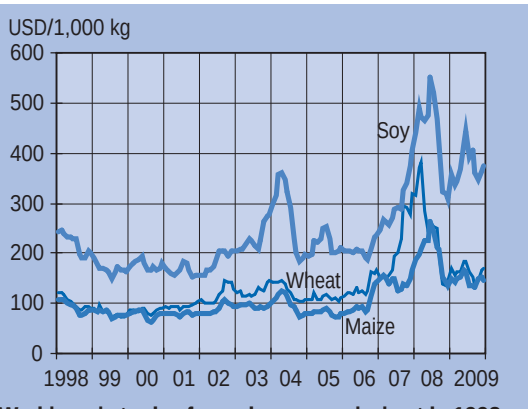
In recent years the prices and price expectations of agricultural products have also been influenced by the growing demand for cereal to be used as raw material for biofuel. Part of the arable area that was used for growing food and fodder cereal has now been taken over to meet the need for increased biofuel production.

In the future the population growth and increased prosperity will cause pressures on the world market prices of agricultural products. The world population is growing by 70–80 million persons a year. The competition for higher standard of living among the population-rich Asian countries means that more and more people are starting to consume larger quantities of meat and milk products. Rearing of livestock, in turn, consumes large quantities of cereal, which means that more of the arable areas now used for food production will be needed for growing animal feed. This leads to higher prices for both cereal and meat.

Some of the reasons behind the price fluctuations of agricultural commodities are not directly linked to the balance between the supply of and demand for food. Like in the case of credit crisis, expectations, speculation and suspicion have their role to play in price variations.

The expectations concerning higher food prices led to a situation where agricultural raw-materials became attractive objects for investments. In the United States, for example, the decrease in share prices in autumn 2007 directed money flows to a growing extent to agricultural commodities. This means that short-term speculative investments influence the functioning of the food market more than ever before.

Very likely the great fluctuations in the supply of agricultural products as well the related considerable variations in the prices have come to stay. Even quite small indications of changes in crop outlook are rapidly reflected in the world market prices. Global warming increases variations in the weather conditions and the frequency of extreme weather events. In Europe the price fluctuations of agricultural products are going to increase simply because the market interventions of the EU, which used to function as significant safety nets, have now been reduced.



World market price for maize, soy and wheat in 1998–2009. Source: USDA, CBOT, CBR.

2.2. Arable crops

Areas and yields

The utilised agricultural area in Finland is 22,959 km^2, which is 6.8% of the total surface area and 7.5% of the land area. The cultivated are (incl. fallow) totals 2,295,900 ha. The cultivated area has increased by 3.5% since 1999, mainly as a result of area payments. Support payments are allocated according to the surface area, which is why less productive parcels are now also used for cultivation and new arable land has been cleared. In the very recent years the cultivated area has not been growing.

During the first years in the EU it was feared that agricultural production would change into more extensive virtual farming, but no concrete indications that actual virtual farming would take place have been observed. The productivity of arable lands could perhaps have grown more rapidly if the price level of the products had been higher. Expanding the production has been more difficult for crop farms than for livestock farms. Additional arable area for expanding crop farms must be sought further away, and often these areas are small and less productive.

The structural change in Finnish agriculture has been strong during the EU period. In 1995, when Finland joined the EU, altogether 99,000 Finnish farms filed an application for agricultural support, but in 2009 applications were submitted by only 63,700 farms.

During the 2000s the area under bread cereals has increased to the same level as or even higher than in the 1980s, after having decreased during the 1990s. Most of this has been due to the growth in the area of spring wheat, which in 2009 was cultivated on 218,300 ha. The area of spring wheat has more than doubled during the EU period. The most significant factor behind the growth in the spring wheat area is that since 2000 this has also been eligible for the LFA support. The total yield has also grown due to the higher yield per hectare.

Wheat is the most important bread cereal, but n recent years it has also become an alternative fodder cereals, alongside barley and oats. In the 2000s the average yield per hectare has been 3,620 kg, with an annual variation from 3,190 to 4,120 kg. The areas of winter wheat have varied very strongly from one year to another. In 2009 winter wheat was cultivated on 16,400 ha and during the 2000s the average yield has been 3,670 kg/ha.

The cultivation area and total yield of rye vary a great deal. During the 2000s the average yield per hectare has been 2,420 kg. The yield per hectare of rye has stayed about the same for the past 30 years, while the yield of spring wheat has increased by 11% during the 2000s when compared to the 30-year average. All through the 2000s it has been necessary to import rye to Finland. To reach self-sufficiency the area under rye should be about 40,000 ha.

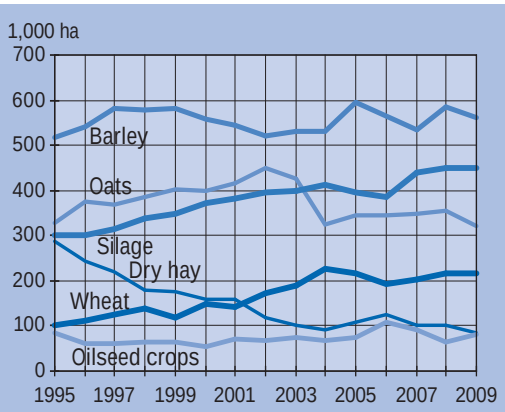
The cultivation area of fodder cereals has stayed about the same during the 2000s and the annual variations have also been quite small. The changes in the percentage shares of compulsory set-aside seem to have had no impact on the cereal area. Instead, the abolition of the set-aside obligation and the simultaneous rise in cereal prices increased the cultivation of cereals in 2008.

During the EU period the average cultivation area of fodder cereals has been 967,510 ha, of which 564,700 ha has been under barley (including malting barley), 384,800 ha under oats and 18,000 ha under mixtures. The average annual production of barley has been 1,929, oats 1,216 and mixtures 46 million kg. The average yield per hectare of barley has been 3,490 and that of oats 3,250 kg.

The set aside area has stayed about the same all through the 2000s. The average area set aside was 215,400 ha and the aver-

age share of the total arable land area was 10%. At the most this has varied by 2 percentage units.

Of the grass area the areas under hay, fresh fodder and pasture have been falling steadily during the 2000s, while the silage area has grown. Very likely the main reason for this is new the technology for silage production, such as round ballers. In 2000 dry hay was still cultivated on 159,500 ha and the crops totalled 586.1 mill. kg, but in 2009 the dry hay areas was only 86,100 and the harvested crop was 289.7 mill. kg. In 2000 the fresh fodder area was 233,000 ha and the crop was 279.8 mill. kg, while in 2009 the area was 14,700 ha and the crop totalled 115.7 mill. kg. The production volumes of both dry hay and fresh fodder halved during the 2000s. In 2000 the silage area was 376,400 ha and the crop totalled 7,128.7 mill. kg, but by 2009 the area had grown to 412,400 ha and the yield had risen to 7,964.7 mill. kg. In 2000 the pasture area was still 117,900 ha, but in 2009 it was only 78,800 ha. The yields per hectare of



Harvested areas in 1995–2009, 1,000 ha.

Harvested areas and yields of main crops in 2008 and 2009.

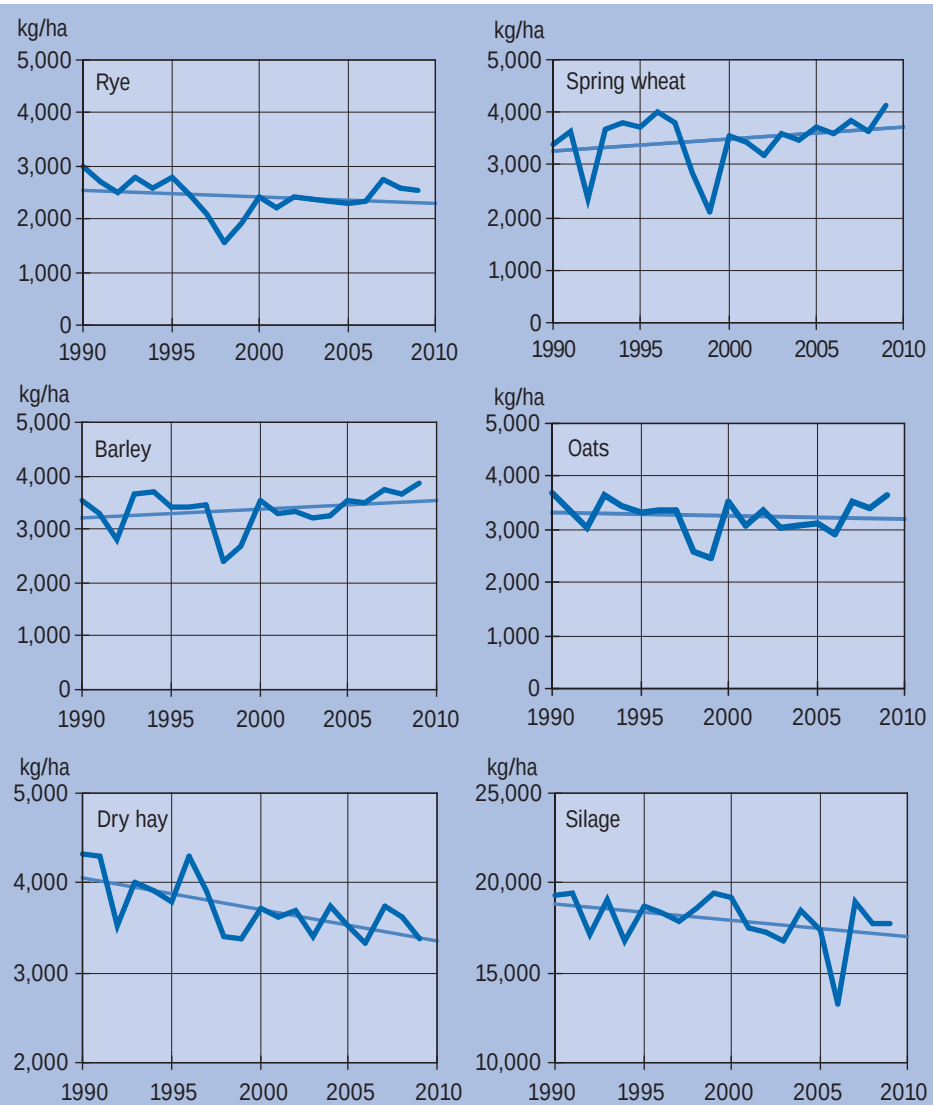
	2008			2009		
	Area 1,000 ha	Yield kg/ha	Total million kg	Area 1,000 ha	Yield kg/ha	Total million kg
Winter wheat	22.8	3,820	87.1	16.4	3,890	63.7
Spring wheat	193.4	3,620	700.5	199.8	4,120	823.3
Rye	23.6	2,580	60.8	16.4	2,550	41.7
Barley	585.5	3,640	2,128.6	561.8	3,860	2,171.0
Oats	354.5	3,420	1,213.4	322.0	3,460	1,114.7
Mixed cereals	12.9	2,880	37.2	15.0	3,020	45.3
Peas	3.3	2,250	7.2	4.2	2,660	11.2
Potatoes	26.2	26,120	684.4	26.4	28,610	755.3
Sugar beets	13.6	34,520	468.0	14.8	37,710	559.0
Dry hay	102.0	3,610	367.8	86.1	3,370	289.7
Silage	451.4	17,790	8,032.7	450.3	17,690	7,964.7
Green fodder	9.6	9,110	87.8	14.7	7,870	115.7
Cereals harvested green	51.6	4,610	227.6	69.8	4,970	346.9
Turnip rape	52.5	1,350	70.6	69.9	1,690	118.0
Rape	11.3	1,620	11.3	11.0	1,980	21.9
Pasture	80.6			78.7		
Other crops	48.2			47.1		
Total	2,043.0			2,004.4		
Set aside and managed uncultivated arable land	188.5			229.8		

Source: Information Centre of the Ministry of Agriculture and Forestry.

both dry hay and silage have stayed about the same during the 2000s, except for the very dry summer of 2006, when the yield levels of both collapsed. Instead, the yield per hectare of fresh fodder has fallen by a third. In the 2000s the average yield per hectare of dry hay was 3,580 kg, that of silage was 17,420 kg and fresh fodder 9,970 kg.

The cultivation area of potato has decreased steadily during the 2000s. In 2000 the cultivation area was 32,200 ha, but by 2009 this had fallen to 26,400. The yield per hectare has grown, however, so that the average production volume has stayed about the same. The yields per hectare have varied very strongly from 20,530 kg to 28,610 kg, which has also been reflected in the total yields. In 1995-2000 the average production volume of potato was 699.5 mill. kg.

The cultivation area and total yield of



Yields of main crops in Finland from 1990 to 2009. Source: Information Centre of the Ministry of Agriculture and Forestry.

sugar beet collapsed in 2005–2007 when the sugar refinery in Salo was closed down. The yields per hectare have risen by 10% during the 2000s. In 2000 sugar beet was cultivated on 32,200 ha and the crop totalled 1,046.0 mill. kg, while in 2009 the area was 14,800 and the harvested crop was 559.0 mill. kg. In 2000 the yield per hectare was 32,550 kg, and by 2009 it had risen to 38,430 kg.

The cultivation area, yield level and total yield of oilseed crops have varied very strongly. In the 2000s the average cultivation area of oilseed crops was 77,100, average yield per hectare was 1,380 kg and the average total yield was 103.9 mill. kg. The demand for oilseed crop is growing rapidly and there would be a need top increase the cultivation area to about 150,000 ha

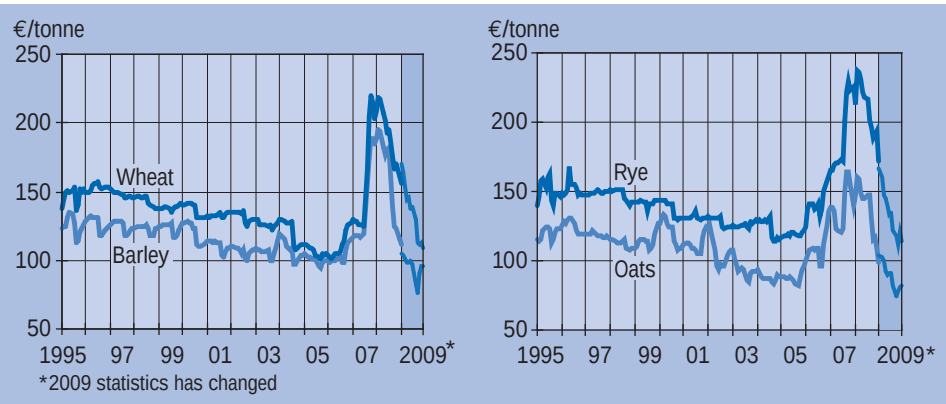
Market prices for arable crops

In the early 2000s the prices for all cereals decreased steadily from one year to another. Towards the end of 2006 the prices started to rise steeply and the peak was reached at the turn of 2007–2008, when the average cereal prices were as much as 70% higher than two years earlier. One reason for the rise was the drought in Australia and Argentina which coincided with two exceptionally bad crop years in Europe. The causes for the high prices also include population growth, bioenergy production, rise in the standard of living in Asia and growth in meat consumption. The fall in the prices towards the end of 2008 was equally dramatic as the rise had been. The main reasons for this were the record-high cereal crops in all parts of the world and the global economic crisis, which started at the end of 2007.

The price of barley fell all through the early 2000s: in 2000 it was still 119 €/tonne, but by August 2006 it has decreased to 98 €/tonne. In October the price of barley started to rise rapidly, reaching the peak of 195 €/tonne in January 2008. In autumn 2008 the price started to fall again so that the lowest price was quoted in September 2009, when the quality-corrected price was as low as 76 €/tonne.

The prices for oats varied considerably in the early 2000s. In 2001 and 2006 the average price of oats was even higher than that of barley, but during 2008 the price of oats never reached the same peak level as barley. The price of oats was the highest in October 2007, when it rose to 164 €/tonne. The lowest price was quoted in September 2009, a little over 74 €/tonne. Oats is not covered by the EU intervention scheme, which is why the price varies more strongly according to the trends in world market prices.

The trends in the prices of bread ce-



Market prices of cereals in Finland from 1995 to 2009. Source: Information Centre of the Ministry of Agriculture and Forestry.

Market prices of cereals in Finland from 1999 to 2009, €/1,000 kg.

	Rye	Wheat	Barley	Oats
2009[1]	134.15	131.95	93.93	86.41
2008	207.02	189.14	160.71	137.80
2007	192.19	159.90	145.80	149.73
2006	139.81	110.50	102.00	107.26
2005	118.41	106.20	99.51	87.13
2004	120.90	119.80	106.51	87.32
2003	124.88	126.66	105.57	92.21
2002	126.57	131.79	106.00	104.38
2001	131.31	132.36	109.66	111.37
2000	131.19	134.55	119.41	117.73
1999	142.96	137.91	122.78	114.37
1998	146.32	142.96	122.78	111.00

[1] Statistics has changed. Basic price paid to farmers on delivery to first customer
Source: Information Centre of the Ministry of Agriculture and Forestry.

reals have been similar to those in barley prices, except that the fluctuations in wheat prices during the 2000s were even stronger. The price of wheat fell during the early 2000s from almost 135 €/tonne in 2000 to less than 112 €/tonne in September 2005. In August 2006 the wheat prices started to rise slowly, and the quite dramatic rise that took place in July–September 2007 increased the price from 124 to 219 €/tonne. As from April the price again started to fall rapidly, but not quite at the same pace as the decrease in barley prices. In December 2009 the price paid for wheat was less than 109 €/tonne.

The price of rye also decreased during the early 2000s. The price was the lowest in October 2004, 114 €/tonne. After that the prices started to rise slowly, reaching the peak level of 237 €/tonne in February 2008, when very high prices were paid for all cereals. After that the price fell rapidly, along with the other cereal prices. The price was the lowest during the decade, a little over 111 €/tonne, in October 2009.

Unlike the cereal prices, the prices for oilseed crops have risen all through the 2000s. The main reason is the growing demand for oilseed crops. The variations in the price have still been considerable. The prices for turnip rape and oilseed rape were the lowest in the very beginning of the decade; in January 2000 the price was less than 164 €/tonne. The price rose steadily, with some variations until May 2004, when it was 263 €/tonne. After that the price collapsed by a third in two months, but started to rise again in the early part of 2005. The highest level during the decade, more than 427 €/tonne, was reached in March 2008, when high prices were paid for all arable crops. After the collapse in cereal prices in summer 2008 the price of turnip rape stayed higher than what it was before the price peak.

The price of food potato has not followed the trends in cereal prices. Instead the potato prices have varied quite strongly according to the production volumes: a good crop has always led to a collapse in the price level. In the early 2000s the entry of early potatoes to the market invariably led to a high price peak in June–July, but towards the end of the decade the peak has been much lower. This is probably due to the growing imports of early potatoes and changes in food culture. In the 2000s the potato prices have always been the highest in bad crop years, such as 2004 and 2006–2008 and the lowest in good years, e.g., 2000, 2002 and 2005. The highest annual average price of the decade 226 €/tonne, was reached in 2004, while the price was the lowest, 102 €/tonne, in 2000.

Market prices of cereals in 2008, €/1,000 kg.

	Rye	Wheat	Barley	Oats
Finland	207.0	189.1	160.7	137.8
Sweden	146.0	185.7	150.2	118.4
Denmark	174.4	203.9	199.8	167.7
Estonia	126.4	155.5	137.0	110.4
Austria	123.3	136.1	-	118.6
England	-	191.0	156.5	129.5
Spain	160.3	190.3	169.7	171.1

Source: Eurostat.

Climate change takes Finnish plant production to a new era

Pirjo Peltonen-Sainio, Kaija Hakala and Lauri Jauhiainen

Greenhouse effect is changing the world's climate conditions in dramatic ways. Finnish agriculture may benefit from the change, but the speed, anticipated great variations with extreme events and other negative aspects involve a great deal of uncertainty. Even if warming could be slowed down through extensive mitigation efforts, its impacts can no longer be fully prevented, which means that adaptation is a necessity. Because warming is progressing even more quickly in the northern parts of the globe, rapid adaptation measures are needed in the Finnish plant production sector. The impacts of climate change and needs for adaptation in plant production have been studied in a project on the adaptation of Finnish agri-food sector to climate change (ILMASOPU). This article presents some of the key findings of the project.

Future prospects of arable crop production

As the climate warms up, the present main crops may be cultivated further in the north and the yield potential may improve considerably. Possibilities for more extensive cultivation of certain at present minor crops, such as oilseed rape, pea and broad bean, may improve as well. All this is founded on better yield capacity, usefulness in crop rotation, nitrogen self-sufficiency of especially the leguminous plants and the fact that their present varieties are already adapted to higher temperatures. These crops also have an important role in improving our self-sufficiency in domestic feed protein. However, increase in the cultivation of certain crops, such as triticale and sunflower, would require more capacity in the processing industry to use the new species in their processes and products. The breeding programmes that are under way or can be easily activated improve the preconditions for cultivating plant species that at present are still quite rare.

In milder winter conditions, winter wheat and triticale are probably the first ones to become more common. The competitive advantage of the winter varieties in the new conditions is their yield potential: they often yield at least 1,000 kg/ha more than the spring varieties. In the future autumn sown crops will also be important in terms of

Main climate change adaptation needs and proposals for measures to improve the productive capacity of Finnish plant production.

Limiting factor	Affected crop species	Adaptation measure
Temperature rise, long day, accelerated development pace	Seed crop plants	Plant breeding
Access to water	Spring sown species	Water economy control systems, plant breeding, winter varieties
Winter hardiness	Overwintering species	Plant breeding, avoiding (foreign) varieties with inferior hardiness
Pest risks	All species	Healthy propagating material, breeding for resistance, protection systems, alarm systems
Extreme events	All species	Alarm systems, reliable varieties, diversity and buffering capacity
Access to nutrients	All species	Fertilisation methods, crop rotation, increased cultivation of leguminous plants, breeding

Source: Peltonen-Sainio, P., Jauhiainen, L., Hakala, K., Ojanen, H. 2009. Climate change and prolongation of growing season: changes in regional potential for field crop production in Finland. Agricultural and Food Science 18: 171–190.

the plant cover as the increasing frequency of rains in the autumn and winter, together with milder winters, increase the risk of erosion and leaching. Adaption aimed at more extensive cultivation of the winter varieties will be challenging due to the increased variation in the conditions during wintertime. Winter oilseed rape, winter barley and winter oats commonly cultivated in Denmark, Scotland and southern Sweden, will not be cultivated extensively in Finland until our cold winters become milder on a more permanent basis towards the end of the century and the conditions start to resemble the present winters in those areas.

The warming climate and longer growing season improve the opportunities for the diversification of cultivation. The preconditions for cultivating certain as yet underutilised species, such as triticale, buckwheat, flax, hemp, sunflower and lupin, will be considerably improved. Of the new species the cultivation of forage maize should also succeed in southern Finland with a moderate risk towards the end of the decade, while the production of grain maize may not be possible even then.

Success requires extensive adaptation to changing conditions

Even if the yield potential will be considerably improved in the future, the yield forecasts will not be realised unless we solve the challenges that restrict the production and are further strengthened by the climate change, as well as plan and implement anticipatory adaptation strategies. In the case of spontaneous adaptation our agriculture will not benefit from the climate change but at their best the yield levels will stay the same as they are now. Determined adaptation efforts may lead to a considerable increase in yield potential, with positive impacts on the productivity of agriculture. However, the possibility to extend the cultivation of certain crops, the expected, even considerable growth in productivity and/or success in adaptation measures alone will not decide what our arable farming sector will be like in the present century. In the future, too, the choices made by farmers and their ability to invest in adaptation measures and, through these, in the general development of arable farming will depend on the agricultural markets, prices and policy decisions.

Anticipated time frames for certain most significant changes in Finnish arable crop production required by climate change adaptation.

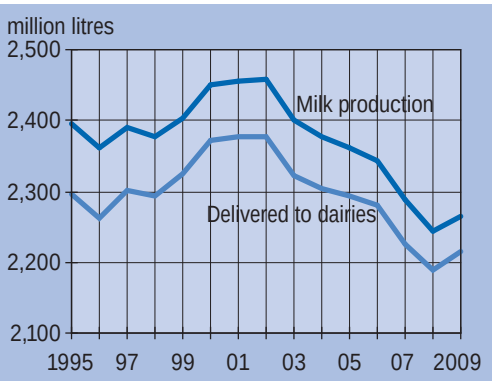
Time frame	Change
2015 →	Need for pest protection grows, more diverse protection options: anticipation and protection increasingly important to avoid uncertainty in production
2015–2025	Current varieties give way: new range of varieties first along the coast, then gradually moving towards the central and northern parts of the country, yield levels rise thanks to adaptation, EU assumes a positive stand on the utilisation of genetic modification
2015–2025	Diversity of cultivation: in particular, oilseed rape has replaced turnip rape and leguminous plants are cultivated commonly to ensure self-sufficiency in protein and nitrogen
2020–2040	Plant production starts to concentrate to the most favourable production regions: self-sufficiency is secured and excess arable areas are used for bioenergy production, exports, strongly specialised production and/or management of nature and arable areas
2020–2040	Control and regulatory systems for water economy in arable areas are introduced, primarily in areas with strongly concentrated production: nutrient cycles are ”closed”
2055 →	Spring varieties are largely replaced by winter varieties
20th century	Extreme weather events cause a great deal of uncertainty for the production and success is repeatedly interrupted by failures

Source: Peltonen-Sainio, P., Jauhiainen, L., Hakala, K., Ojanen H. 2010. Kasvukauden pitenemisen ja olosuhteiden muuttumisen vaikutukset alueellisiin viljelymahdollisuuksiin ja tuotantokykyyn Suomessa ilmaston lämmetessä. Publications of the Scientific Agricultural Society of Finland 26. Editor: Anneli Hopponen. Available (in Finnish) at: http://www.smts.fi.

2.3. Livestock production

Milk

The amount of milk delivered to dairies in 2009 totalled about 2,215 mill. litres, which was 17 mill. litres more than in 2008 and 81 mill. litres less than in 1995. The production of organic milk has increased by 80% from the beginning of the millennium to 29.4 mill. litres in 2009. The cows gave birth to 321,900 calves.



Milk production and the amount of milk delivered to dairies in Finland from 1995 to 2009. Source: Information Centre of the Ministry of Agriculture and Forestry.

Milk production grew towards the end of the 1990s so that the national quota of Finland was exceeded in the quota periods that ended in 1999–2002. After 2001 the output has decreased by 7%. In quota period 2008/2009 milk production was 228 mill. litres below the national quota. According to the forecast of the Gallup Food and Farm Facts, in the quota period 2009/2010 the production will remain 215 million litres below the quota and in 2010 the output will total 2,223 mill. litres

In 1995–2009 the total number of dairy cows fell from 389,500 to 284,399 (–27%). The number of dairy farms fell from 32,161 to 11,516 (–64%, 7% a year) and the average herd size increased from 12 to 25 cows. The output per cow increased by 30%.

In 2009 the production of butter totalled 48.5 mill. kg (–4% from the previous year and +8% from 1995). Cheese production totalled 103.2 mill. kg (–2%, +17%) and that of milk powders 20.3 mill. kg (+74%, +28%). The production of liquid milk products amounted to 712 mill. litres.

In 2009 a total of 15 mill. kg of butter was consumed (+6% from the year before), and cheese consumption totalled 110 mill. kg (+4%). The consumer price of butter was 30% lower than the year before. The production of liquid milk totalled 698 mill. litres (–0.4%) and that of yoghurts 120 mill. kg (+1%).

The oversupply in milk decreased in 1995–2009 and now the domestic production is quite well in line with the consumption. The consumption has also shifted to lower-fat products. The total consumption of liquid milk products decreased by 7% and butter consumption by 42%, but cheese consumption grew by 41%.

The share of exports in the production of butter, yoghurts and cheeses increased in 1995–2009. Only about a third of the butter produced is consumed in Finland. Cheese imports, e.g. from Denmark, Germany and Poland, grew almost seven-fold.

In 2009 cheese exports totalled 50 mill. kg (+25% from the year before). The share of imports (44 mill. kg) in cheese consumption grew to 39% and the share of imported yoghurts (29 mill. kg) to 24%. Of the fat contained in milk produced in Finland as much as a half is used for the export products. Instead, the protein contained in milk is used in Finland.

Beef

In 2009 a total of 81 mill. kg of beef was produced in Finland. It was 15 mill. kg (–16%) less than in 1996 but 1% more than in 2008. Beef production has been falling rapidly so that in the past 15 years our self-sufficiency in beef has decreased from 100% to 84%.

The number of slaughtered animals fell by 32% in 1996–2009. The number

of slaughtered bulls decreased to 145,000 (–27%). Due to the decrease in milk production the number of slaughtered cows fell to 85,000 (–36%).

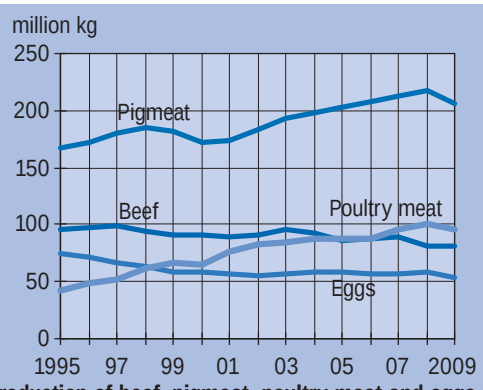
The increase in the average slaughter weights of bovines has slowed down the decrease in beef volumes. In 2009 the average slaughter weight of bulls was 338 kg (+63 kg since 1996), that of cows was 275 kg (+45 kg) and heifers 244 kg (+40 kg).

The number of suckler cows has grown to 52,500 in 2009 (+80% since 1995).

In 2009 a total of 93.5 mill. kg of beef was consumed. In 1995–2009 the consumption fell by 3%. Except for two years during the period the consumption exceeded the domestic production. Consumption has shifted to poultry meat and game, as well as preserved meats and prepared meals. According to a forecast by the Gallup Food and Farm Facts, in 2010 beef consumption will be about 91.5 mill. kg and about 81.7 mill. kg will be produced.

Beef exports and imports have varied from one year to another. In 2009 beef exports totalled 1.4 mill. kg (2% of the production), which is 5.7 mill. kg less than in 1995. Beef imports totalled 14.8 mill. kg (16% of the consumption), which is 9.4 mill. kg more than in 1995.

Beef has been exported from Finland almost exlusively to Sweden and Norway, while most of the imports come from Sweden, Denmark, Brazil, Germany and, in 2009, Poland. A large share of processed meats imports come from Sweden.



Production of beef, pigmeat, poultry meat and eggs in Finland from 1995 to 2009. Source: Information Centre of the Ministry of Agriculture and Forestry.

Pigmeat

In 2009 pigmeat production in Finland totalled 206 mill. kg. The production has grown by 20% since 1996. The volume last year was 11 mill. kg (5%) below the record level reached in 2008. The main reasons for the decrease were the decoupling of national aid, compensation for withdrawal from the production and high fodder prices in 2007–2008. According to the Gallup Food and Farm Facts, in 2010 a little over 201 mill. kg of pigmeat will be produced, which is the lowest level since 2004.

In 1996–2009 the number of slaughtered pigs rose by 12% to more than 2.34 mill. and the average slaughter weight of fattening pigs increased by 6.1 kg to 85.8 kg. The number of slaughtered sows fell by 20% but that of fattening pigs rose by 13%. The size of pig farms more than doubled and the number of farms fell in all size classes except for the class of the largest farms (>300 sows or >3,000 fattening pigs). The number of piglets sold in 2009 was 132,000. Regionally, almost 75% of the pigs are fattened in Varsinais-Suomi and Satakunta in south-western Finland and three regions in Ostrobothnia.

In 2009 pigmeat consumption rose to 183.6 mill. kg, which is 9% more than in 1996. Exports of pigmeat totalled 45.2 kg in 2009. This is about six times the exports in 1995, but 18% lower than in the record year 2008.

About a third of the Finnish pigmeat exports went to Russia, another third to other non-EU countries and a little over a third to EU countries. At the end of the 1990s about 50% of the exports still went to Russia. Now important target destinations for pigmeat exports include Sweden and the Baltic States, especially Estonia, as

Livestock production in Finland from 1995 to 2009.

	Dairy milk million litres	Beef million kg	Pigmeat million kg	Eggs million kg	Poultry meat million kg
2009	2,215	81	206	53	95
2008	2,188	80	217	58	101
2007	2,226	87	213	57	95
2006	2,279	85	208	57	88
2005	2,293	84	203	58	87
2004	2,304	91	198	58	87
2003	2,323	94	193	56	84
2002	2,376	91	184	55	83
2001	2,378	90	174	57	76
2000	2,371	91	173	59	64
1999	2,325	90	182	59	66
1998	2,300	93	184	64	61
1997	2,301	99	180	67	53
1996	2,261	96	172	71	49
1995	2,296	96	168	75	43

Source: Information Centre of the Ministry of Agriculture and Forestry.

well as South Korea and Japan.

Pigmeat imports to Finland totalled 23.4 mill. kg, which s about 12.8% of the domestic consumption. Pigmeat imports tripled in 1995–2009. Most of the imports came from Denmark and Germany, which has become the largest importer. In 2009 more than half of the processed meats came from Sweden. The simultaneous increase in imports and exports has been observed in most OECD countries.

Poultry meat

In 2009 poultry meat production in Finland totalled 94.9 mill. kg. Since 1996 poultry meat production has increased by 124%. The production of turkey meat has grown the most, almost seven-fold. Its impact on total production volume is still quite small, because 90% of the poultry meat produced in Finland is broiler meat.

The production of broiler meat totalled 94.9 mill. kg (–5% from 2008) and that of turkey meat was 8.9 mill. kg (–13% from the year before). The forecasts for 2010 are 86.5 mill. kg of broiler meat and 8.5 mill. kg of turkey meat.

In 2009 a total of 95.4 mill. kg of poultry meat was consumed in Finland. This is 90% more than in 1996. Now the poultry meat products are more highly processed than before and the share of poultry meat in the total consumer expenditure on meat has grown. Broiler meat consumption totalled 86.2 mill. kg and that of turkey meat 8.9 mill. kg. The consumption forecasts for 2010 are 89 mill. kg of broiler meat and 9 mill. kg of turkey meat.

Before 1995 very small quantities of poultry meat were exported from and imported to Finland. In 2009 poultry meat imports consisted of 8.7 mill. kg of broiler meat (+14%) and 1.7 mill. kg of turkey meat (–17%). The imports came from e.g. Brazil, Thailand, Sweden, France, Denmark and Germany. The share of high-value added products has grown so that in 2009 more than half of the imports consisted of prepared meats. The share of boneless parts in the carcass meat imports is also considerable. Broiler meat imports represented 10.1% and turkey meat imports 18.8% of the domestic consumption.

Poultry meat exports totalled 11.1 mill. kg. Of the exports 9.8 mill. kg was broil-

er meat (–1% from the year before) and 1.3 mill. kg was turkey meat (+9%). The main targets for exports are Estonia, Russia, Hong Kong and Latvia.

Eggs

In 2009 egg production totalled 53.4 mill. kg, which was 29% smaller than in 1995 and 7.5% less than in 2008. The sales for raw material to egg processing industry fell by 30% from the year before. Egg production fell rapidly in the first years in the EU: in 1997 the production was already 27% lower than in 1995. During the 2000s the production has varied between 53 and 59 mill. kg. Of the production 1–4% has been sold directly from the farms. Egg production per hen has increased by 5% since 1995. The average size of egg farms has more than tripled to 2,600 hens.

In 2009 the production volumes were reduced by the Salmonella Tennessee epidemic, which removed 440,000 hens from the market (–7%). According to a forecast by the Gallup Food and Farm Facts, the number of laying hens in January–July 2010 is 18% higher than the year before.

Egg consumption amounted to 50.3 mill. kg (+2% from the year before). In 1995–2009 egg consumption fell by a total of 16%. In the first years in the EU egg consumption in Finland decreased by 6% a year. Since 1998 the consumption has varied between 48 and 53 mill. kg.

Export volumes have varied from one year to another, depending on the oversupply. In 2009 egg exports totalled 6.9 mill. kg, which is 30% less than the year before. Egg imports have grown in recent years. In 2009 the imports totalled 3.4 mill. kg, 63% more than the year before.

Production in traditional battery cages may continue until the end of 2011. The use of the alternative production methods, such as barn systems and organic production, has increased very slowly. In 2009 75% of the grade A eggs still came from battery cage systems.

The producer prices of the most important livestock products in Finland from 1999 to 2009 including production support (€/100 kg, milk €/100 l). The figures include estimated retroactive payments[1].

	Milk	Beef	Pig-meat	Poultry meat	Eggs
2009	39.74	247	141	124	87
2008	44.05	241	144	130	92
2007	38.25	221	132	114	77
2006	36.39	212	126	109	62
2005	35.22	205	128	114	60
2004	35.75	190	120	117	74
2003	36.68	186	115	117	80
2002	36.83	190	137	120	79
2001	36.26	208	150	117	69
2000	34.97	206	129	111	82
1999	34.44	216	113	112	74

[1] Producer price for milk with standard protein and fat content, does not include quota levies. The price for 2009 includes estimated retroactive payment of 1.80 cents/l. Source: Information Centre of the Ministry of Agriculture and Forestry.

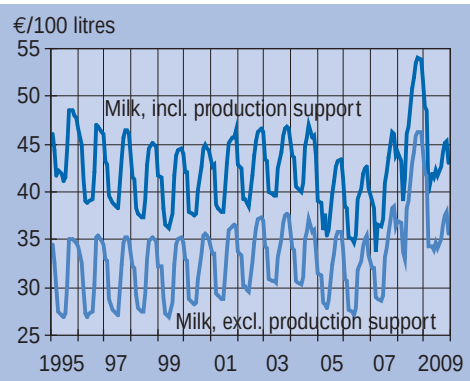
Producer prices

When Finland joined the European Union in 1995 both the price support paid to agricultural products and producer prices of livestock products decreased. Price reductions were to some extent compensated for through increased direct income support. Of the main livestock products the price of eggs fell the most (–65%) and the price of milk the least (–28%).

Market prices for livestock products in certain EU countries in 2009, €/100 kg.

	Milk	Pigmeat	Beef (bull)	Poultry meat[1]	Eggs[1]
Finland	39.79	144.7	294.9	245.8	116.9
Sweden	25.27	137.8	294.3	180.5	168.2
Denmark	25.46	122.9	311.5	184.6	170.7
Estonia	20.65	149.8	215.2	170.2	104.6
Germany	23.21	146.0	317.5	249.1	100.8
France	28.84	131.1	323.5	212.7	108.2

[1] January–September
Source: European Commission.



Producer price of milk in Finland from 1995 to 2009. Source: Information Centre of the Ministry of Agriculture and Forestry.

The market prices of livestock products in the EU influence their prices in Finland, but the Finnish prices also have special characteristics. The market prices for pigmeat and milk usually vary less in Finland than in most other EU countries and the price changes observed on the European market are transmitted to the Finnish prices slowly. In Finland there is oversupply in eggs, and their producer price is low compared to the other parts of the EU. Instead, the prices paid to the milk producers are slightly higher in Finland than in the EU on average, and in Finland the differentiation by season is also greater.

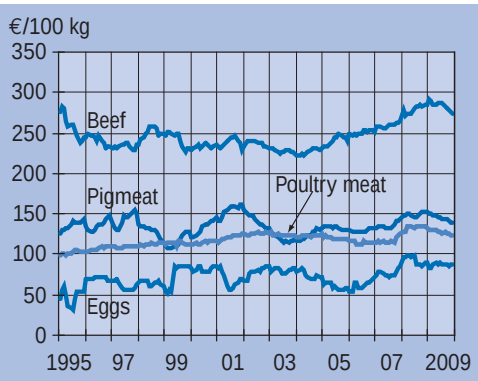
In 2009 the average producer price for standard milk with quality premiums was 38.82 €/100 l (–10% from 2008). In addition to this, the average of 7.3 €/100 l was paid as production aid. The final price for milk is determined when the dairies complete their financial statements and the retroactive payments based on the result are decided. In 2008 the average retroactive payment was 1.8 €/100 l.

The average price paid to the producers for bull meat was 2.84 €/kg, which was 2% higher than the year before. The average price for all types of beef was 2.47 €/kg (+2%). Beef prices fell from 1996 until 2003, but after that the price has risen by a third. Towards the end of the 1990s the BSE crisis hit the beef market.

The prices for pigmeat and eggs have varied considerably in recent years. The European pigmeat market has been affected e.g. by the classical swine fever epidemic in the Netherlands in 1997–1998 and soaring fodder prices in 2007–2008 and the eastern enlargement of the EU. In 2009 the average price paid for pigmeat was 1.41 €/kg, which was about 2% less than the year before. The average price paid for a piglet (30 kg) was 60 euros, which was 2% higher than in 2008.

The average producer price for poultry meat in 2009 was 1.27 €/kg, which was 4% lower than the year before. The increase in the price of fodder cereals first increased and then decreased the prices paid for poultry meat. The price for broiler meat was 1.24 €/kg, which was 5% less than in 2008 but 10% higher than in 1996.

The average producer price for eggs in 2009 was 0.87 €/kg. The nominal price was 6% lower than in 2008. The price varies between the production methods: the prices paid for eggs produced in barn systems was 10% and that of organic eggs a third higher than the price of eggs from battery cage systems.



Producer prices of beef, pigmeat, poultry meat and eggs in Finland from 1995 to 2009. Source: Information Centre of the Ministry of Agriculture and Forestry.

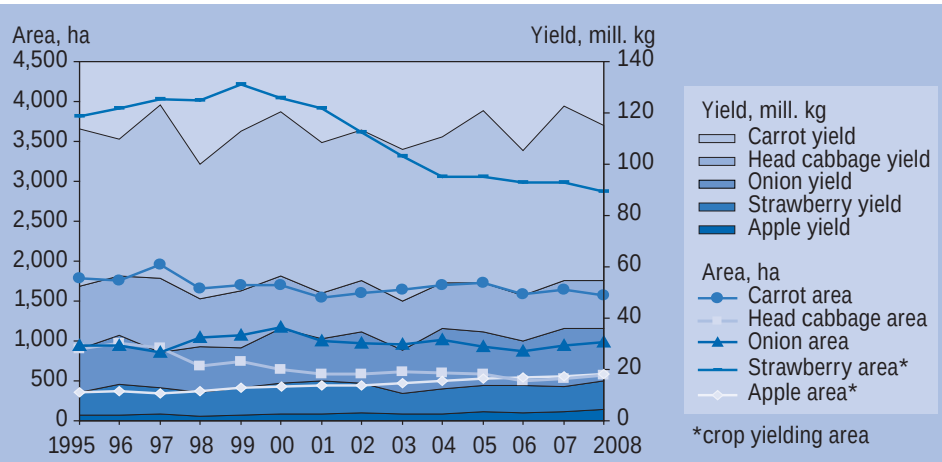
2.4. Horticultural production

In the past 15 years considerable structural changes have taken place in the horticulture sector. The number of horticulture enterprises has fallen from almost 10,000 in 1996 to the present 4,900 enterprises. The cultivation area of horticulture has not, however, decreased as strongly. In 1995 the area under horticultural production was 18,800 hectares and today the area is about 16,000 ha. The total yield of production in the open has been quite stable, 160–190 mill. kg, in spite of the considerable annual variation depending on the conditions during the growing season. Instead, the output of vegetables grown in greenhouses has increased from 60 mill. kg to the present almost 76 mill. kg.

Production in the open

The production in the open comprises the outdoor cultivation of vegetables, cultivation of berries and fruits and outdoor cultivation of nursery plants and cut flowers. The main production regions of outdoor vegetables are Satakunta, Varsinais-Suomi and Häme in south-western Finland, while North Savo and North Karelia are strong berry production regions. Most of the apple production takes place on the Åland Islands and in Varsinais-Suomi. Nursery production is mainly located in Häme and Uusimaa.

In the past 15 years the total output of vegetables has been 150–170 mill. kg a year, of which a third is based on production contracts concluded with the processing industry. Even if the total volume has not varied that much, changes have taken place in the production volumes of individual crops due to both consumer preferences and profitability problems. Of the traditional crops carrot has retained its position, but the production of other traditional vegetables such as cabbages, root celery, leek and pumpkin has decreased in the past decades. Of the outdoor vegetables onion and various kinds of lettuces have gained in popularity. The production volume of onion has grown by a third since 1995 and the production volumes of lettuces have almost doubled. According to the groups of plants, root vegetables are now the most significant group with a 55% share, followed by cabbages with a 17% and onions with a 14% share. Of the cultivation area under outdoor production about 1% is used for organic production.



Cultivation areas and yields of main horticultural plants grown in the open in 1995–2008. Source: Information Centre of the Ministry of Agriculture and Forestry Tike, Horticultural Enterprise Register.

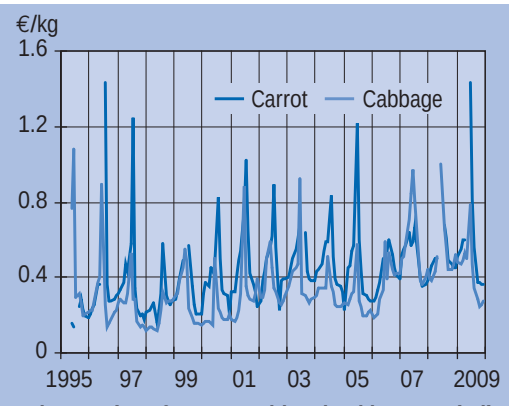
Strawberry is by far the most significant berry plant in terms of both the area and the crop yield. The total annual yield has stayed about the same in the past 15 years, varying between 9 and 11 million kg. The production area has, however, decreased from 5,200 ha to the present 3,200 ha. The yields per hectare of strawberry have increased due to the more advanced irrigation systems, especially drip irrigation, as well as more efficient plant protection practises especially in preventing grey mould.

In the past decade the use of domestic berries by the Finnish food industry has decreased, which has been reflected as a decrease in the total yield of especially currants. Most of the berries produced in Finland today are used fresh, while the share covered by production contracts with the processing industry in the berry crop is only 8%. As the production of certain traditional berries, especially currants, has decreased, new berry plants, such as buckthorn and bush blueberries have been introduced and their cultivation area grew all through the past decade. The cultivation area of raspberry has also been growing steadily to the present 400 ha of crop-yielding plants. Of the berry production area 8% is under organic production.

In the past 15 years the cultivation area of apples has grown from 360 to 555 ha and the output has almost doubled from 2.4 mill. kg to 4.2 mill. kg. Despite the increase in the production, domestic apples cover only 3–5% of the present consumption. The production technology of apples has advanced dramatically in the past 15 years. In the new plantings moderate vigour trees have been substituting for vigorous trees. In the present dense cultivation system twice the number of moderate vigour trees can be planted in the same area compared to the traditional vigorous trees, which means that a much higher yield per hectare can be harvested. In apple production more efficient irrigation and plant protection and new domestic varieties that are particularly well suited to the Finnish conditions have also contributed to higher production efficiency

The number of enterprises engaged in nursery production has decreased considerably: in 1996 almost 380 enterprises practised nursery production, but by 2009 their number had fallen to 190. The area under nursery production has fallen from 810 to 510 ha. The reduction in the area does not, however, always mean smaller volumes, because today more of the nursery production takes place in containers instead of open fields.

In horticultural production in the open the prices are characteristically high in the early part of the crop season, then they fall during the main season and increase again towards the end of the season. The prices for products that are stored, such as carrot, onion and cabbage, usually rise as the storage period proceeds. The weather conditions during the growing season influence the prices of horticultural products a great deal. A heat wave during the main crop season usually means that a lot of the crop matures at the same time, which creates oversupplies on the market and may cause the prices to collapse momentarily. The congestion of the market is the most typical for products with a short shelf life



Producer price of carrot and head cabbage excluding tax in 1995–2009, €/kg. Source: Kasvistieto Oy.

such as strawberries, which keep only a few days.

Greenhouse production

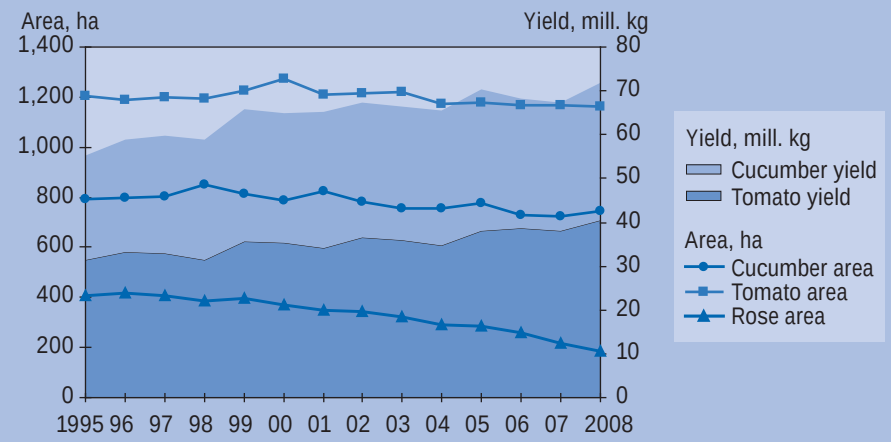
Of the greenhouse area 60% is used for vegetable production, 35% for the production of ornamental plants and 5% for other plants. Most of the vegetables are cultivated in Ostrobothnia and Varsinais-Suomi, while the production of ornamental plants is more evenly distributed across the country. In terms of the cultivation areas the most important vegetables are cucumber and tomato and the most important ornamental plant is rose.

The total yield of greenhouse production has grown in the past 15 years. The production of greenhouse vegetables has increased the most, despite the decrease in the production area. The growth in the production volumes of potted vegetables has been quite dramatic, e.g. the number of potted lettuce produced annually has risen from 24 million to 60 million. The production of various potted herbs has doubled over the past 15 years.

Besides vegetables, the volumes of bulbous flowers and bedding plants grown in greenhouses have increased in the past 15 years. The number of bulbous flowers, tulip as the most significant one, has grown from 50 million to the present 73 million. The number of bedding plants has grown from 38 million to 46 million. The increased production of bedding plants is mainly due to the growing popularity of violets, while the production of petunia, the favourite of the early 1990s, has been falling all through the 2000s.

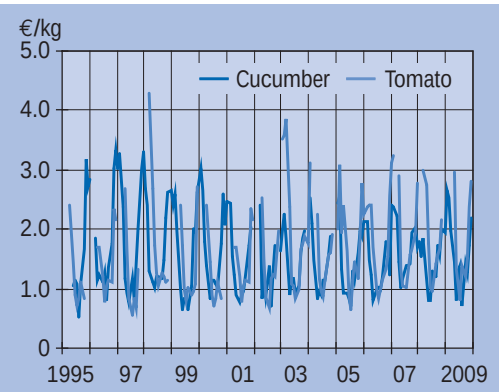
The area of the domestic production of cut flowers has collapsed by a third from 1995 to the present 260 ha. The most dramatic fall has taken place in the production area of cut chrysanthemums, which in the past 15 years has decreased from 150 to 6 ha. During the same period the area of cut roses halved to the present about 180 ha. In the case of cut roses, however, the increase in the number of roses produced per square metre has to some extent compensated for the decrease in the area.

The efficiency of greenhouse production has improved considerably in the past 15 years. Lighting was started in the early 1990, allowing production round the year and improving the production efficiency during the growing season by compensating for the shortage of light during the dark days. Before lighting was introduced, greenhouse production had to be stopped for the winter months (Novem-



Cultivation areas and yields of main greenhouse plants in 1995–2008. Source: Information Centre of the Ministry of Agriculture and Forestry Tike, Horticultural Enterprise Register.

ber–February) due to shortage of light. Now both vegetables and ornamental plants are produced round the year. Of the area under cucumber and tomato, for example, 20% is used round the year, while the rest is cultivated without lighting, with a break during the winter months. Another significant improvement was the introduction of biological prevention, where pests are prevented using their natural enemies and which is now being used on most of the vegetable production area and part of the area under ornamental plants. In these areas no pesticides are used or they are used only to bring particularly serious pest problems under control.



Producer price of greenhouse cucumber and tomato excluding tax in 1995–2009. Source: Kasvistieto Oy.

The annual producer price of the most significant greenhouse vegetables, cucumber and tomato, excluding tax has been quite stable over the past 15 years, at around 1.6 €/kg for cucumber and a few cents higher for tomato. In practice, however, the prices have fallen due to the decrease in the value of money. In the case of cucumber and tomato there is great seasonal variation in the price because of the smaller volumes and higher production costs in winter than in summer. This means that the price level is still much higher during the winter months, even if some decrease has taken place as winter production has become increasingly common.

Future prospects of horticulture

According to the current knowledge, the Finnish horticulture sector should benefit from the upcoming climate change. The effective temperature sum of the growing season will rise and the growing season will get longer. This will benefit the plant species cultivated at present, as well as make it possible to introduce new plants, such as pear and plum, for commercial horticultural production. However, frost during the early growing season is not expected to become much less frequent. Based on forecasts, precipitation during the growing season should decrease, which means that irrigation, both to prevent frost damages and during the main growing season, will be increasingly important for successful cultivation. Today there is high-quality irrigation water available in abundance, but in the future more attention needs to be directed to the access to sufficient water supplies.

Structural development will continue in the horticulture sector and production will concentrate to even larger units. For certain groups of plants such regional concentration is a permanent feature because it is often based on soil and climate conditions of a specific area that are favourable for certain plants.

Horticultural production is highly dependent of foreign labour. Even now employees from other countries account for a fifth of all working days in horticulture, and this share has been growing rapidly in recent years. In the future the harvesting and maintenance works in horticulture will to a growing extent be done by migrant workers. In the cultivation of certain plants the substitution of human labour with machines is going to increase, but much of the horticultural work remains dominated by manual labour. The growth in the farm size promotes mechanisation.

2.5. Food market

Consumer prices

Food prices fell by the average of 11% when Finland joined the EU 15 years ago, even if the VAT on food was raised by a few percentage units. The reason for the decrease was that the agricultural producer prices fell to the same level as in the other Member States and food imports from the other EU countries were liberalised.

From 1995 until 2007 food prices in Finland rose less than the other prices. The increase in food prices in nominal terms was 15%, while during the same period the general consumer price index rose by almost 20%.

Instead, between 2008 and 2009 the rise in the food prices exceeded clearly the average inflation. During these two years the food prices rose by 10.8% while the annual change in the consumer price index was only 4.1%.

For an average consumer, however, food has become much cheaper during the EU period as the wages have risen by more than 65% in the past 15 years. In 1995 people had to work for more than four hours to fill a certain food basket, but in 2009 it took only three hours to earn this amount of money.

Average consumer prices of some foodstuffs in December from 2007 to 2009, €/kg.

	2007 December	2008 December	2009 December
Wheat flour	0.40	0.60	0.55
Rye bread	3.15	3.56	3.52
Beef roast	10.19	12.38	12.25
Pork fillet	11.75	12.41	11.54
Chicken breast fillet	10.73	11.39	11.28
Light milk, €/litre	0.73	0.90	0.85
Emmenthal cheese	10.85	12.66	12.37
Eggs	2.76	3.01	2.89
Butter	4.74	5.56	4.04
Margarine	2.64	3.00	2.86
Tomato	4.91	5.21	4.47
Potato	0.69	0.78	0.64

Source: Statistics Finland, consumer price statistics.

Development of average consumer price index and the consumer price index of foodstuffs in Finland in 1995–2009, 1995 = 100.

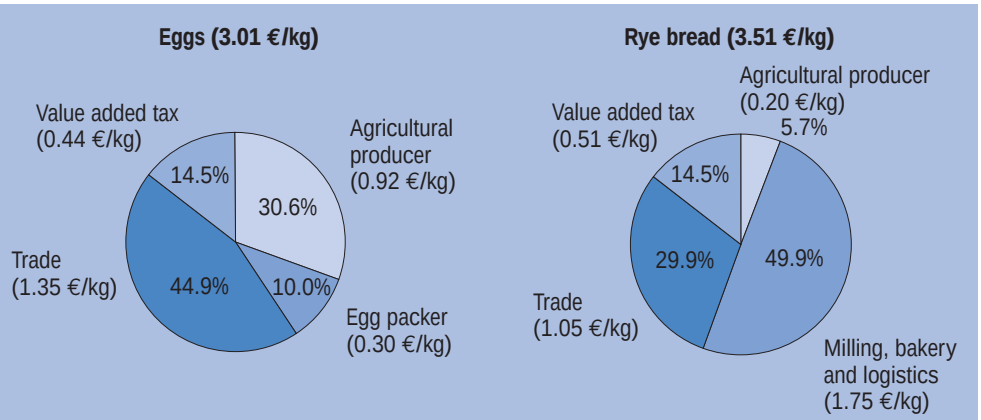
	Consumer price index	Price index of foodstuffs
2009	124.5	127.7
2008	124.4	125.2
2007	119.6	115.3
2006	116.7	112.9
2005	114.7	111.4
2004	113.7	111.1
2003	113.5	110.3
2002	112.5	109.6
2001	110.8	106.5
2000	108.0	102.0
1999	104.4	101.0
1998	103.2	101.3
1997	101.8	99.6
1996	100.6	98.2
1995	100	100

Source: Statistics Finland.

In October 2009 the VAT on food was lowered by five percentage units from 17 to 12%, which meant a reduction of 4.3% when taken directly to the food prices. The food prices did fall by the amount of the reduction, even a little more: according o the Statistics Finland, between September and October the food prices fell, on average, by 5.6%. The reason for the greater reduction than caused by the lower VAT alone was that the prices of vegetables and fruit decreased more. In December 2009 food was still 5% cheaper than a year before.

Food is still a little more expensive in Finland than in the old EU Member States. The main reason is the high VAT: even after the reduction the VAT on food in Finland is still the second highest within the EU. Only Denmark has a higher VAT on food.

Besides the trends in food prices the public discussion in recent years has centred around the distribution of the price paid by the consumer within the food chain. Studies have shown that the share of trade in the consumer price of food in-



Composition of the consumer price of eggs and rye bread in 2008.

cluding tax has increased during the EU period. The position of the trade sector has become stronger because it is able to take advantage of the competitive tendering within the food industry and, through this, the primary production sector on stricter terms than before. The percentage share of the primary producer in the consumer prices of foodstuffs has decreased.

The rapid growth in the productivity of agriculture has been directly reflected in the producer price: growth in productivity by 1% has, on average, led to a 1% decrease in the producer price. In the wholesale and retail sector the effect is similar, but slightly smaller: a 1% growth in productivity has led to an average of 0.6% decrease in the consumer prices. This means that in the trade sector part of the benefit from productivity growth has shifted to the margins of the companies.

Trends of change in the food chain during the EU period

The accession to the EU led to quite dramatic changes in the operating environment of the Finnish food chain. Agricultural policy became part of the EU's common agricultural policy. The import pro-

Average consumer prices of some foodstuffs in 2005–2009, €/kg.

	2005	2006	2007	2008	2009	Change % 2008–2009
Light milk, €/litre	0.74	0.73	0.72	0.87	0.89	2.3
Butter	4.96	4.87	4.79	5.78	4.59	–20.6
Margarine	2.35	2.35	2.53	2.98	3.11	4.4
Emmenthal cheese	10.59	10.86	10.82	12.13	12.86	6.0
Beef joint[1]	9.08	9.92	10.04	11.79	12.62	7.0
Pork fillet	-	10.64	11.40	12.23	12.27	0.3
Chicken breast fillet	10.84	10.46	10.67	11.32	11.68	3.2
Eggs	2.33	2.44	2.74	3.01	2.99	–0.7
Wheat flour	0.59	0.41	0.41	0.60	0.60	0.0
Rye bread	3.15	3.18	3.15	3.51	3.65	4.0
Tomato	2.99	3.21	3.51	3.63	3.58	–1.4
Potato	0.65	0.60	0.74	0.76	0.76	0.0

[1] From 2006 beef roast.
Source: Statistics Finland, consumer price statistics.

Consumption of milk products, margarine, meat and eggs per capita in 2000–2008, kg.

	Liquid milk[1]	Butter	Margarine	Cheese	Ice cream (litres)	Beef	Pigmeat	Poultry meat	Eggs
2008[e]	189.2	2.8	7.5	18.4	12.6	18.2	35.3	18.5	9.6
2007	189.2	2.5	7.5	17.5	13.3	18.7	34.9	17.6	9.5
2006	183.9	2.7	7.5	19.1	13.7	18.5	34.3	15.8	9.3
2005	184.8	2.7	6.6	18.6	14.0	18.6	33.5	16.1	9.4
2004	186.2	2.6	6.6	18.4	13.2	18.6	33.8	16.0	9.4
2003	185.1	2.4	6.8	16.7	13.7	18.0	33.5	15.8	9.3
2002	190.0	3.0	7.6	16.6	13.5	17.9	31.9	15.4	9.7
2001	191.7	3.5	7.8	16.5	13.3	17.9	32.7	14.5	9.7
2000	193.9	3.8	7.7	16.5	13.5	19.0	33.0	13.2	10.1

[1] Including liquid milk, sour milk products and cream.
Sources: Gallup Food and Farm Facts, Information Centre of the Ministry of Agriculture and Forestry.

tection of the processing sector, comprised of tariffs, quotas and licences, was abolished. The wholesale and retail companies and consumers benefitted from the free import opportunities, while the food industry was faced by a tough competition challenge. During the 15 years in the EU the dominating trends in the Finnish food chain have been concentration, internationalisation and growing significance of contractual procedures.

Concentration of the market structure has proceeded in all parts of the chain, i.e. primary production, food industry and the retail sector, but there have been differences in both the initial situation and the pace of the change.

Internationalisation has brought along both opportunities and threats for the different parts of the chain. On the one hand, internationalisation has created growth potential when investments are made in the neighbouring regions. On the other hand, internationalisation has the opposite effect when foreign competitors become established on the Finnish market or ownership and decision-making of Finnish companies move abroad.

The role of contracts between the different parts of the food chain has become increasingly important. At times of frequent fluctuations in the raw material prices production contracts with fixed prices would provide the means to control the price risks for both farmers and the industrial companies. The rapid rise in the raw material prices of the food industry led to changes in the supply contract procedures between the industry and retail trade as well. The time span of the contracts with fixed prices was shortened from the earlier three to twelve months and now the contracts may include a clause concerning the adjustment of the prices should a considerable decrease or increase take place in the raw material prices.

Structural changes in retail trade

The market structure of the Finnish retail sector has been concentrating for a long time, but before the accession to the EU the pace was quite moderate. In 1980 the two leading chains dominated about 58% of the market and in 1995 their share was 62%. In 2000 the market share of the two leading retail chains was 66% and by 2005 this had risen to almost 70%. In recent years the concentration has accelerated even more so that in 2009 their share of the market was more than 77%. The competition situation in the retail trade of daily consumer goods is more and more clearly a case between two big ones. The

structural change is also reflected in that the Finns are concentrating their food purchases to large retail units which manage an ever growing share of the grocery sales. Between 1995 and 2009 the share of the sales of hypermarkets rose from 15 to 26% and that of large supermarkets from 20 to as high as 33%. In the beginning of 2010 there were only 3,351 retail outlets left and 58% of the sales took place in the 680 largest stores. The number of small shops, so-called village shops, in the countryside and sparsely populated areas has fallen to almost a half during the EU period.

The sales volumes of daily consumer goods have grown considerably during the EU period. In the first years the lower prices promoted the sales through growth in the volumes. The development of food prices has been moderate so that usually food prices have risen less than the other prices. Price competition is particularly tough among the food suppliers, which was also the main reason for the internal structural arrangements of the retail chains. Retailers of daily consumer goods have searched for higher efficiency and significant cost savings especially through more disciplined business operations within the chains.

The largest companies in the trade sector have rapidly become organised into chains, i.e. they have concentrated their procurement operations. Today about 80% of foodstuffs are purchased in a centralised way from large suppliers and distributed through nation-wide logistics channels, while only 20% of the foodstuffs are purchased locally. Of the local produce bakery products, fresh meat and fresh cheeses still find their way to the shelves of local food stores.

The role of the food chains' own private labels has strengthened. The appearance of discount chains, especially the German Lidl, has also impacted on the market structure. Since the entry to the Finnish market in 2003 the Lidl chain has increased competition especially in the discount segment. By 2009 Lidl was estimated to have exceeded a 5% share of the Finnish market.

Tighter competition in food industry

The structural changes in wholesale and retail sectors have influenced directly the market opportunities of food processors mainly through four processes: concentration, chains, discount stores and private labels.

The changes have led to great challenges for domestic food producers, requiring them to produce higher volumes through more and more cost-efficient means. Only the largest companies with significant nation-wide market shares are able to take full advantage of the economies of scale.

Instead, small enterprises have the opportunity of responding to consumer needs through special products and supply of fresh products on the local market. Medium-sized enterprises are the most vulnerable ones, because the product range they offer is usually very similar to the range offered by the large competitors. Thus the companies in this size category may run into serious difficulties, as has been the case in meat processing industry.

Higher production efficiency

Certain individual companies started to make conscious efforts to improve the competitiveness of the Finnish food industry already in the late 1980s. Excess capacity and production costs were reduced, inefficient production plants were closed down and investments were targeted to the creation of new, modern processing capacity.

Since then the trend has continued mainly through investments in more efficient processing technology, which in turn has made it possible to achieve savings in labour costs. The value of the production has risen from one year to another, with a diminishing labour input. The productivity of labour has improved in almost all sectors of food industry.

Key figures on the Finnish food industry in 1995–2008.

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Turnover (at current price, billion €)	7.7	7.8	8.0	7.8	7.5	7.9	8.3	8.4	8.5	8.9	8.9	9.2	9.7	10.5
Turnover (at 2008 price, billion €)	9.6	9.7	9.8	9.4	8.9	9.1	9.3	9.3	9.3	9.7	9.6	9.8	10.1	10.5
Personnel (thousands)	44.9	44.6	44.2	42.8	40.7	39.9	38.6	38.0	38.2	37.5	36.7	35.9	35.7	34.6
Real turnover per person (thousand €)	214	228	241	244	244	259	262	274	283	304	242	257	272	304

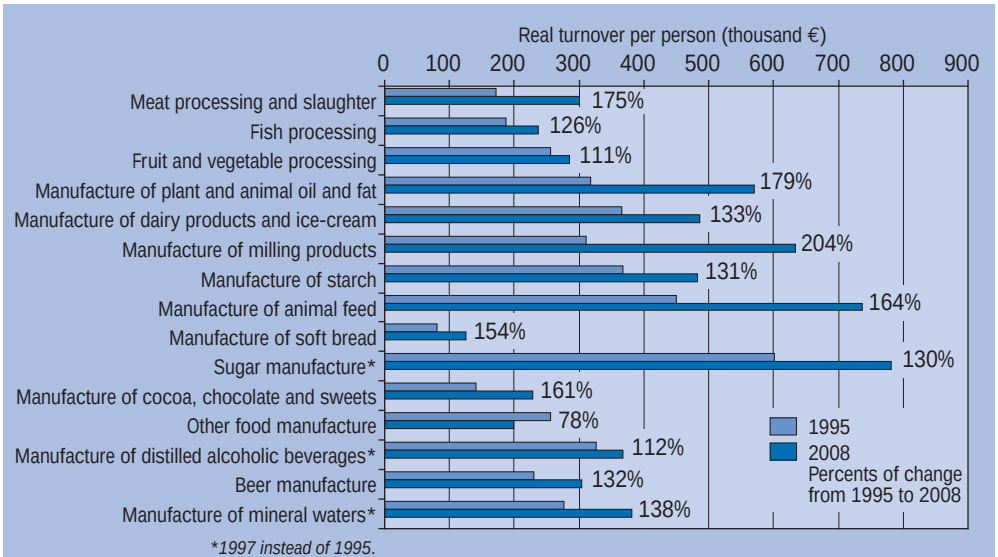
Source: Statistics Finland, Finnish Enterprises 1995–2008, calculations by MTT.

After the rapid decrease in the early 1990s the number of people employed in food industry has been falling at a more moderate pace to about 34,600 employees in 2008. The total turnover of food companies has grown, except for the slight downturn on the export market towards the end of the 1990s. In 2008 the gross value of the production was almost € 10.5 billion, which is € 2.8 billion higher than the nominal level in 1995.

Between 1995 and 2008 the real turnover of food industry per employee rose from € 214,000 to € 304,000, i.e. 42%. The improvement in the productivity of labour was above the average in e.g. milling, feed, vegetable oil and confectionary industry, as well as in meat processing and even in the labour-intensive bakery industry. Higher efficiency was also reflected in a decrease in the number of places of business, especially as the large companies with nation-wide networks of plants have in recent years started to concentrate their operations geographically to larger plants while closing down smaller units.

Internationalisation

Finnish food companies have been active partners in cross-border investments. The first steps in foreign investments were al-



**1997 instead of 1995.*

Development of the productivity of labour in food industry sectors. Sources: Statistics Finland, Finnish enterprises 1995–2008, calculations by MTT.

ready taken in the early 1990s, but a greater wave got started towards the end of the decade after Finland had joined the EU. The main reasons for this were the limited food markets in Finland and the new market opportunities that opened up in the neighbouring countries.

The growth considered necessary in view of globalisation and intra-EU competition has been searched for in the neighbouring areas, mainly in the Baltic Sea region. Most of the foreign investments of Finland have been targeted to the Baltic States, Sweden, Russia and Poland. Both geographically and in terms of the size of the markets of these areas have been the best suited for the Finnish companies seeking to expand on the international market.

During the 2000s the foreign investment portfolio grew to € 1.6 billion. The brewery and bakery industries and companies engaged in dairy and meat processing have been the most active in investing abroad. Individual investments have also been made in milling, vegetable oil, coffee, snack and malting industries.

At the same time the Finnish food industry has become increasingly attractive to foreign investors. In 2008, however, the amount of direct foreign investments to Finland fell to € 811 million, mainly as a result of disinvestments and reorganisation of investments between countries.

In 2008 the number of foreign owned companies in Finland was 31, which is only 1.8% of the total number of food companies, but they accounted for 19.6% of the turnover of the sector and employed 14.2% of the staff. Thus the foreign investments in food processing have concentrated to a few large units.

The most popular sectors for foreign investments have been the brewery, sugar, confectionary and biscuit industries, fruit and vegetable processing and the manufacture of other foods. Most of the foreign investors come from the Nordic countries, especially Sweden and Denmark.

Foreign direct investment (FDI) stocks of food industry by countries at the end of 2008, € million.

Outward FDI		Inward FDI	
Sweden	524	Sweden	183
Estonia	228	Denmark	104
Russia	205	Germany	82
Latvia	53	Norway	74
Lithuania	32	Other countries	368
Other countries	601	TOTAL	811
TOTAL	1,643		

Source: Bank of Finland.

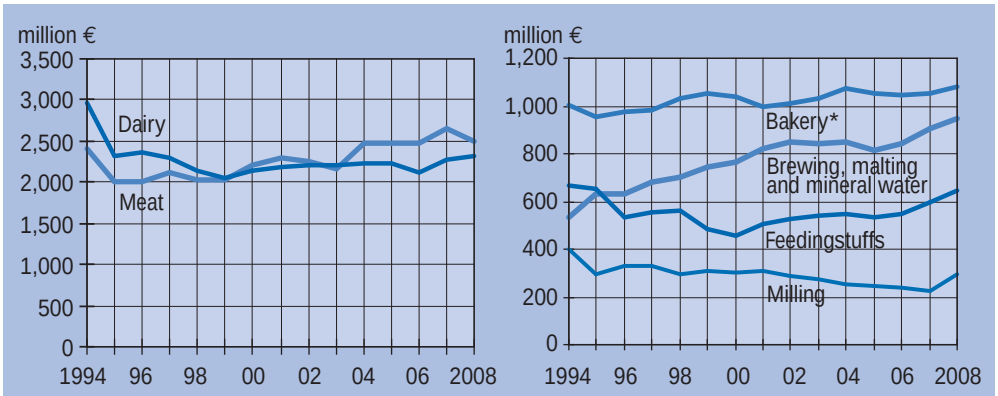
Structural development of sectors during the EU period

There have been significant structural changes among the sectors since 1995. The changes in the traditional trade with Russia had great impacts on the turnover of the dairy industry, and especially the crisis of the Russian rouble in 1998 and 1999 led to a dramatic fall in the turnover.

In meat processing the development has been more stable, after having recovered from the steep decrease in the prices that followed the accession to the EU. The growing popularity of high-value added products such as prepared meals and dishes and the tripling of broiler consumption have promoted the growth of the turnover in the meat sector.

Of the two largest sectors the dairy industry was the winner – partly thanks to its concentrated structure – in the global rise of raw material prices in 2007–2008 as the real turnover of the sector grew in both years. Instead, the turnover of the meat processing sectors was considerably reduced by the high cereal and feed prices in 2008.

The high cereals prices increased the value of the production of industrial sectors engaged in cereal processing. The real turnover of milling industry rose for the first time after 12 years, and the turnover of feedingstuff and bakery industries increased as well. There was also some



**Includes soft bread, crispbread and biscuit manufacture.*

Turnover of Finnish meat and dairy industry and certain other sub-sectors of food industry at 2008 prices.

growth in the turnover of the brewery and soft drink industries.

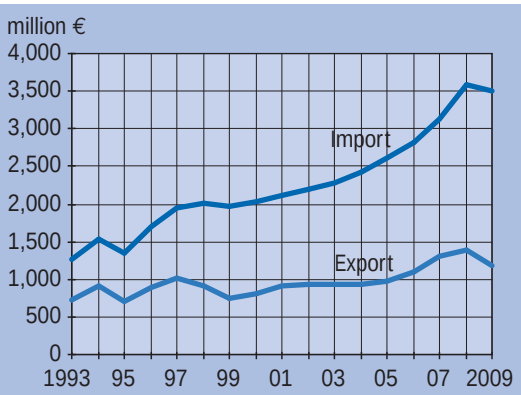
Foreign trade

In 2009 the value of food exports from Finland totalled € 1,189 million, which is 15% lower than the year before. After certain difficulties in the very beginning of the EU period the Finnish food exports started to grow steadily and reached a record level in 1997. The devaluation of the Russian rouble led to a collapse in food exports from Finland in 1998. After 1999 there was again some growth in exports but this stopped to a little under a billion in the early 2000s. The rapid growth which started in 2006 ended in 2009 as a result of the global economic crisis.

The share of Russia in Finnish food exports has varied between 20 and 25%. In 2009 it was 23.8%. Traditionally more than half of the Finnish food exports have gone to the neighbouring countries, and in 2009 their share was about 54% (Sweden 16.2%, Estonia 10.4% and Norway 3.7%).

The most significant single product group in food exports is still cheeses, which in 2009 represented 12% of the total food exports. Other important export articles are butter, sugar industry products, pigmeat, cereals and alcoholic beverages.

The value of food imports to Finland was € 3,500 million in 2009, which is 2.5% less than the year before. This means that the growth that started in 1995 and continued at an even quicker pace as from 2005 – at 6–15% a year – came to an end. Fruit, raw coffee, vegetables, alcoholic beverages and tobacco represent about a third of food imports to Finland. Other important import articles include vegetables, cheese and cereal products.



Exports and imports of agricultural products (CN 01–24) in 1993–2009. Source: National Board of Customs, ULJAS database.

3. AGRICULTURAL POLICY

Finnish agricultural policy is founded on the support schemes set down in the common agricultural policy of the EU, i.e. direct payments funded by the EU and the co-funded natural handicap and agri-environment payments.

These are supplemented by national aids, which comprise the northern aid, national aid for southern Finland, national top-ups to the natural handicap payments and certain other aids.

3.1. Common agricultural policy of the EU

The common agricultural policy has been implemented since the 1960s through common organisations of the markets for specific products. The basic idea is that the fall of the prices within the EU below a certain level is prevented by means of public intervention, while the prices of imported foodstuffs are raised to the EU level through import duties. Oversupplies are exported to third countries by means of the EU export refunds.

The share of expenditure which arises from the common agricultural policy in the EU budget is very high indeed, more than 40% of the total budget in 2010. It should be born in mind, however, that in the other sectors the integration does not go as wide and deep and there is no common policy in the same way as is being implemented in the agriculture sector through the CAP.

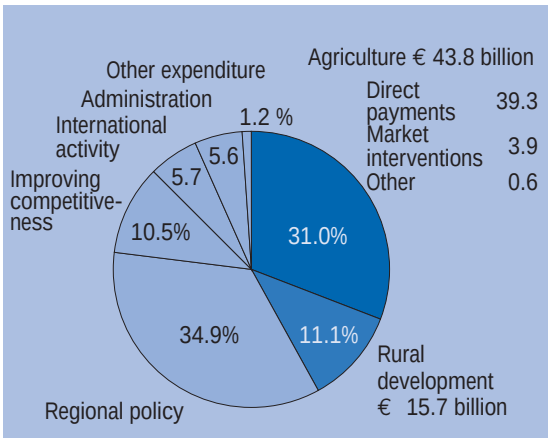
At present the common agricultural policy is comprised of the so-called first and second pillar. Most of the funding (75%) is allocated to the first pillar, mainly market support and single payments. The rest of the funding (25%) is used for rural development measures under the second pillar (Rural Development Programmes).

In the early 1990s most of the CAP funds were still used for export refunds of agricultural products and other market interventions. Since then, however, the common agricultural policy has been reformed several times and piloted into a more market-oriented direction.

CAP reforms

As a result of the policy reforms of 1992 and 1999 the intervention prices of cereals, beef and milk in the EU were lowered closer to the world market prices. The price reductions were compensated for by means of direct payments, which is why support payments based on the arable area and livestock numbers have gained a central position in the EU policy.

In the policy reform of 2003 most of the EU payments for arable crops and livestock were transferred to the decoupled single payment scheme (SPS). At the same time new conditions relating to the environment, maintaining the productivity of the land, food safety, animal welfare and occupational safety were incorporated



EU budget for 2010, € billion

into the scheme.

In November 2008 the EU agriculture ministers decided on the latest reform of the common agricultural policy, also called the health check. The decision continues the earlier reforms and strategic outlines, aimed to increase the market orientation of EU agriculture. Decoupled payments will be applied even more widely and some of the remaining production restrictions are abolished to allow the farmers to respond better to the market demand.

The latest CAP reforms include the so-called modulation, in which a gradually increasing share of the CAP support is redirected to rural development measures through the EU budget. In 2009 7% of the support payments to farmers who receive more than € 5,000 in direct payments a year was cut, in 2010 the percentage rises to 8%, 2011 to 9% and 2012 to 10%. In addition, the compulsory set aside and, through this, the non-food payment scheme will be abolished. The cut does not apply to the first € 5,000 of each farm.

The modulation funds are used for responding to climate change mitigation and adaptation, promoting renewable energies, improving water supply and protecting biodiversity.

Distribution of EU support for agriculture

Finland has succeeded quite well in obtaining agricultural funding from the EU since the accession to the Union in 1995. In this context serious efforts were made to highlight the exceptional climate conditions were the Finnish agriculture has to operate. This fact has been widely recognised in the EU, both in the Accession Treaty and in decisions made later on.

Relative to the value of agricultural production the Member States of the EU-15 receiving the largest support payments in the programming period 2000–2006 were Ireland, Finland and Greece. Relative

Agricultural support in different Member States of EU-15 in programming period 2000–2006.

	€ million	Of which the share of rural development support (%)	Share of the Member State in EU support for agriculture (%)	Share of the Member State in agricultural production of EU-15 (%)	Share of EU support of the GDP of the Member State
Austria	7,746.5	42.1	2.9	2.0	0.49
Belgium	6,163.6	5.3	2.3	2.6	0.31
Denmark	8,171.4	4.0	3.0	3.2	0.61
Finland	5,791.9	38.5	2.1	1.4	0.56
France	62,035.7	8.8	23.0	22.6	0.55
Germany	41,860.2	13.1	15.5	15.5	0.27
Great Britain	25,835.2	4.6	9.6	8.4	0.21
Greece	14,200.4	7.1	5.3	4.0	1.17
Ireland	11,466.7	21.2	4.3	2.0	1.17
Italy	32,851.1	14.0	12.2	15.0	0.35
Luxemburg	255.9	34.5	0.1	0.1	0.14
Netherlands	6,932.8	6.2	2.6	7.2	0.21
Portugal	4,961.7	25.2	1.8	2.1	0.51
Spain	35,551.7	10.1	13.2	12.3	0.64
Sweden	5,853.8	19.7	2.2	1.6	0.30
EU-15	269,678.6	12.2	100.0	100.0	0.40

Source: EU Commission (2008) EU Budget 2007, Financial Report.

to the gross domestic product the greatest beneficiaries were Greece, Ireland, Spain, Denmark, Finland, France and Portugal. Relative to the GDP the least EU support was paid in Luxembourg, Great Britain and the Netherlands.

In absolute terms, in the programming period 2000–2006 the highest amount of EU support was paid to France, a total of € 63 billion, which is 23% of all CAP funds. The second largest amount of support was paid to Germany, followed by Spain, Italy, Great Britain and Greece.

Agricultural support in Finland

In 2010 the support under the common agricultural policy to the Finnish agriculture will total about € 1,341 million. This consists of the CAP support for arable crops and livestock (€ 545 million), natural handicap payments for less-favoured farming areas (€ 422 million) and environmental support (€ 374 million). These are funded either by the EU alone or co-financed by the EU and Finland.

CAP payments are an integral element of the common market organisations and they are funded in full from the EU budget. The EU contributes a little more than a quarter of the natural handicap payments and environmental support. The rest is paid from national funds.

In 2010 the national aid for Finnish agriculture and horticulture will total about € 565 million. The national aid scheme comprises the northern aid (€ 336 million), national aid for southern Finland (€ 87 million), national top-ups to natural handicap payments (€ 119 million), and certain other national aids (€ 23 million).

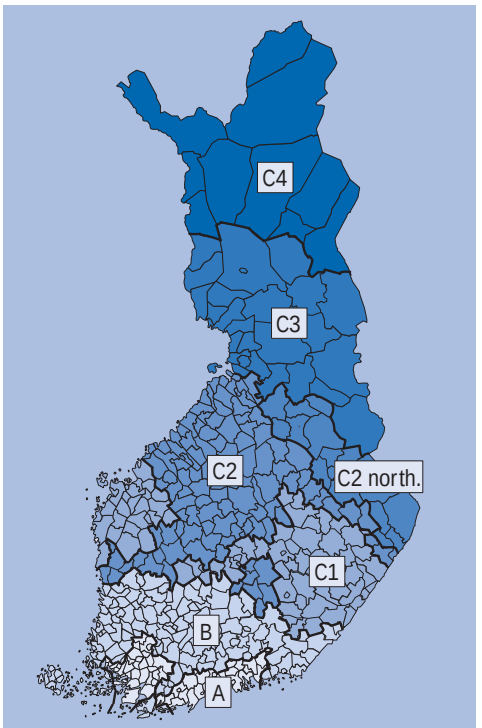
Finland has been divided into seven support areas for the allocation of the payments. CAP support, environmental support, natural handicap payments and the national top-ups to these are paid in the whole country.

Northern aid is paid only in support area C. This has been divided into five areas for the differentiation of the aid. National aid for southern Finland (so-called aid for serious difficulties) is paid in areas A and B.

CAP support

Most of the so-called CAP support financed in full by the EU is paid through the single payment scheme adopted in 2003. In Finland the single payment scheme is implemented as the so-called hybrid model. Former CAP payments were converted into payment entitlements, which consist of a regional flat-rate payment and farm-specific top-ups.

CAP support has two main components: decoupled single payments and payments which continue to be coupled to the production. In Finland about 90% of the CAP support was decoupled from the production in 2006. The CAP support for arable crops was decoupled almost completely. Under the single payment scheme, howev-



Support areas.

Agricultural support based on the CAP in Finland (financed in full and part-financed by the EU), € million.

	2005	2006	2007	2008	2009prelim.	2010estimate
Total	1,229	1,255	1,287	1,308	1,325	1,341
CAP income support	515	541	551	557	555	545
Natural handicap payments	421	420	421	421	420	422
EU contribution	132	131	118	118	118	118
National financing	289	289	303	303	302	304
Environmental support*	293	294	315	330	350	374
EU contribution	144	102	88	92	98	104
National financing	149	192	227	238	252	270
EU financing, total	791	774	757	767	771	767
National financing, total	438	481	530	541	554	574

**Environmental support also includes payments relating to animal welfare and non-production investments.*

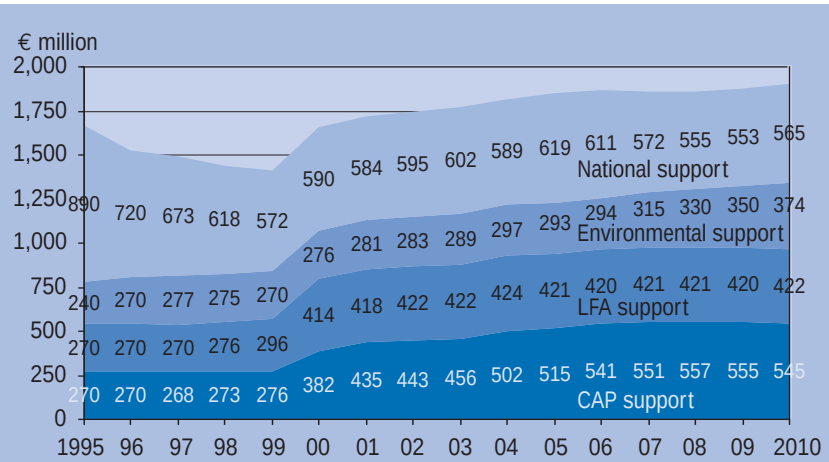
er, coupled support is still paid up to € 5.8 million for certain arable crops. Coupled support will also continue to be paid for suckler cows, male bovines and ewes and starch potato.

According to the cross-compliance conditions included in the CAP support, the arable lands must be kept in good farming condition and minimum requirements for animal welfare and state of the environment must be met. Based on a national decision, any area set aside in Finland as managed, uncultivated arable area must be covered with grass in order to be eligible.

Natural handicap payments (LFA)

Certain rural regions in the EU have been defined as less favoured areas. The purpose of natural handicap payments (LFA support) is to ensure the continuation of farming in these regions and keep the rural areas populated. In Finland LFA support is paid for the whole cultivated area of about 2.16 million ha.

The amount of natural handicap payments to less favoured areas in Finland budgeted for 2010 is € 422 million. The payment is 150 €/ha in area A, 200 €/ha



Agricultural support in Finland in 1995–2010, € million.

in areas B and C1 and 210 €/ha in areas C2–C4.

Environmental support

Agri-environmental support introduced in 1995 compensates for income losses resulting from the reduction in the production and increased costs as farmers commit to undertake measures aimed to reduce environmental loading caused by agriculture. The term of most of the environmental contracts ended in 2006 and the application of contracts under the support scheme of the new programming period got started in 2007.

The main objectives of the new environmental scheme are quite similar to those of the earlier programmes. The most important goal is to practice agriculture in a way that causes less burden on the environment. Biodiversity of farming environments and cultural landscapes must be preserved and conditions must be created for continuing the production in the long term. The objectives also include reducing erosion in arable lands and increasing the amount of humus in the soil.

The environmental support scheme is presented in more detail in Chapter 5.3 (pp. 67–69).

3.2. National aid

The national aids paid in Finland comprise the northern aid, national aid for southern Finland, national top-ups to natural handicap payments and certain other payments. The aim is to ensure the preconditions for Finnish agriculture in different parts of the country and production sectors. The principles to be applied in determining the level and regional distribution of national aid were agreed in the membership negotiations. The aid may not increase the production, nor may the amount of aid exceed the total payments before the accession.

Northern aid

The Accession Treaty of Finland (Article 142) allows the payment of national northern aid to areas north of the 62nd parallel and adjacent areas (support area C). A little over 1.4 million ha, 55.5% of the cultivable arable area in Finland, is eligible for this aid.

Northern aid consists of milk production aid and aids based on the number of animals and cultivated area. The northern scheme also includes the aid for greenhouse production, storage aid for horticultural products and wild berries and mushrooms and headage-related payments for reindeer.

Northern aid paid in 2010 totals about € 335 million. The most significant types of aid are the northern aid for milk production (€ 155 million) and northern aid based on livestock units (€ 100 million).

The effectiveness of the northern aid is evaluated every five years. In 2007 the European Commission commissioned an evaluation of how well the objectives set for northern aid have been reached and whether the means applied are still feasible and justified. Based on the results the Commission and Finland discussed the future and development needs of the northern aid in 2008.

As a result of the agreement reached in December 2008, the aids for pig and poultry meat production were decoupled from the production in 2009, but coupled payments continue to be applied in cattle husbandry.

In the national negotiations between the State and agricultural producers in the beginning of 2009 it was agreed that as from that year the decoupled payments under Article 142 are differentiated according to the farm size. Up to 200 livestock units the aid is the same for all farms located in the area eligible for the northern aid. For the share exceeding 200 livestock units the aid is lower; in 2009 the same as in support areas A and B. Because of the decision

National aid for agriculture in Finland, € million (aid per production year).						
	2005	2006	2007	2008	2009 prelim.	2010 estimate
Total	619.0	611.4	571.6	554.7	552.7	565.1
Northern aid	330.2	327.3	328.8	327.4	327.5	335.8
National aid for Southern Finland	99.0	96.5	94,0	93.5	90.4	87.0
National supplement to environmental support	55.0	55.0				
National supplement to the LFA support	120.1	119.9	119.6	119.3	119.3	119.3
Other national aid	14.7	12.7	29.2	14.5	15.5	23.0

the amount of payments for pig and poultry husbandry in the area covered by northern aid fell by 3.2% from 2008.

National aid for southern Finland

The national aid for southern Finland, i.e. support areas A and B, is based on Article 141 of the Accession Treaty. This article has allowed the payment of aid due to serious difficulties resulting from the accession to the EU, but it does not define the concept of serious difficulties in any more detail or limit the duration of the measure.

The Finns have interpreted the article so that it gives the authorisation to the payment of the aid in the long term, while the Commission has seen it as a temporary solution.

Finland must negotiate with the Commission on the continuation of the aid based on Article 141 every few years. According to the outcome of the negotiations reached in November 2007, Finland may grant both national direct aids and raised investment aid for livestock production and horticulture in southern Finland until the end of 2013.

In 2010 the aid under Article 141 to southern Finland will total € 87.0 million, which is 3.7% less than the € 90.4 million paid in 2009. The aid will decrease by 3.7% in 2011 as well, while in the last two years of the period the total amount of aid under Article 141 will be reduced by a total of over € 30 million. The aid for pig and poultry farms will be cut the most. In 2013 the total amount of this aid will be € 62.9 million.

The structure of the aid under Article 141 has also changed. From 2009 onwards decoupled farm payments have been applied in pig and poultry sectors, mainly according to production quantities of 2007. Instead, the aid for ruminants will continue to be coupled to the production all through the current aid period.

The aid under Article 141 also contains investment aids and start-up aid for young farmers. Finland may continue to apply higher investment aids in sectors which are eligible for direct income payments under Article 141 (in particular, investments in dairy and cattle sectors and pig and poultry production).

National top-ups to natural handicap payments

National top-ups to natural handicap payments have been paid in the whole country since 2005 based on a tentative agreement reached in the negotiations between Finland and the Commission in 2003. The basic top-up paid for the arable area may not exceed 20 €/ha in areas A, B and C1 and 25 €/ha in areas C2–C4. A raise for livestock not exceeding 80 €/ha is paid for the arable area of livestock farms. In 2009 the payments totalled about 95% of the maximum according to the hectares. The total of the co-financed natural handicap payments and the national top-ups may not exceed the average of 250 €/ha.

Cereal and oilseed sectors in transition – are markets overruling policies?

Csaba Jansik

When Finland joined the EU in 1995 the Finnish foreign trade was liberalised and since then the framework conditions for the domestic cereal cultivation have been determined by the EU rules and changes in the internal market area. The preconditions for cereal production and exports have been safeguarded through production support, intervention and export refunds. All through the 2000s the Finnish cereal market was fairly quiet and stable with a low basic price level for cereals and relatively little fluctuation.

Increased price fluctuation

In the first decade of the new millennium, however, the sensitive balance between demand and supply was at risk of being broken in the world market at any time. The global demand for cereal grew much more than the production for several consecutive years. The consumption of bread cereals increased due the growth in the world population and feed consumption because of changes in the consumer habits and increase in meat consumption in large emerging countries such as China. Another reason for the high demand for cereals is biofuel production, which has great impacts especially on the US cereal markets. In 2007 the problem of the gradually diminishing world cereal stocks was exacerbated by a severe supply shock as serious crop failures or damages occurred simultaneously in all the world's largest cereal producing regions. As a consequence of the high demand, low stocks and diminishing production the world cereal prices soared in autumn 2007.

The price peak lasted all through the crop season 2007/08, after which the prices came down as rapidly as they had risen. The reason was, again, the balance between demand and supply. In 2008 the demand fell due to the financial crisis that shook the whole world and due to the general economic depression. At the same time record high cereal yields were harvested in two years in a row. Balance was restored on the cereal market and the price fell back to the earlier, rather low level.

The price level of 2007 cannot, however, be considered an isolated price peak alone. After the current depression we will be faced with growth trends in cereal consumption even more strongly than before. The world demand for cereal is growing, whether in the form of bread or meat, and the use of new potential cultivation areas does not seem to keep up with the increased demand. In such a situation a crop failure in a single major exporting country or several countries may lead to a new price shock and soaring prices. In the next decades we can expect to see considerable fluctuation in cereal prices.

Focus from policies to markets

The two most significant factors influencing the operating environment of the EU cereal chain are policy and markets. Over the past decades policy has steered and supported, in particular, the primary production sector, but the support for this has always also impacted on the other parts of the cereal chain and their income formation. The common agricultural policy of the EU has been reformed several times since the 1990s. External and internal pressures to more radical reforms grew in the middle of the

present decade. The eastern enlargements in 2004 and 2007 introduced new elements to the agricultural policy reforms. The need for support payments in the new Member States and their record high cereal yields in 2005 caused a considerable burden to the EU's intervention system.

High world market prices in 2007/08 provided a new incentive to continue the reform process of the common agricultural policy. The time seemed to be right for the decisive release of policy regulation from the cereal and oilseed crop production. The operating environment of the cereal sector had changed: support had been decoupled from production, tariff protection had been reduced, export refunds had been abolished and the coverage of cereal intervention system had been decreased. The aim of the Commission was that the cereal and oilseed crop sectors of the EU would primarily be regulated by the demand and supply on the world market.

The relationship between agricultural policy and cereal market has changed in Finland as well. The cereal market influences the operations of the sector much more than before. This does not, however, alter the fact that in Finland the support payments are still a precondition for agricultural production – without these, cereal cultivation could not be practised on these latitudes.

Agricultural production is inevitably to a growing extent regulated by the markets. The attractiveness and long-term structural development of different production sectors is largely determined by the trends in the real prices of agricultural products. Market prices also steer the short-term structural changes in cereal and oilseed crop production, because the relative prices in the following years influence the distribution of the area under different cereals and oilseed crops.

From coarse grains to specialised crop production

The Finnish cereal sector suffers from one particular feature of the farms structure changes: growing numbers of livestock farms are shifting to arable crop cultivation. The number of dairy and meat farms fell from 52,000 to about 20,000 in 1995–2008, thus promoting the continuous growth of the farm size, large-scale investments and higher efficiency. At the same time the number of cereal farms has stayed around 28,000–30,000 due to especially the farms which have quitted livestock production and taken up cereal cultivation. This slows down the structural development and the efficiency improvement of cereal cultivation, because many farms settle for the mass production of coarse grains and low yield levels. The future of the Finnish arable crop sector is in the hands of professional producers of cereals and oilseed crops who invest in the production and inputs, follow the markets and changes in the demand and are prepared to introduce risk management tools to alleviate the consequences of rapid price changes.

In addition to the demand-supply situation on the world market, the cereal oversupply of the crop season 2009/10 was largely caused by the dominating role of coarse grains in Finland. Barley and oats have been considered as safe products, partly motivated by the price peak of 2007/08 and the intervention mechanism of the EU. Now Finland has an excess supply of one million tonnes of coarse grains in stock, which is very difficult to dispose of on the export market. As from the next year barley is no longer covered by intervention, which means that the Finnish arable crop sector must rapidly adapt its structures to the changes on the market. In the use of arable land coarse grains must be replaced by high-quality cereal, oilseed crops and protein crops, whose demand is quite stable. Organic production and energy crops are feasible options as well.

4. ECONOMIC SITUATION OF AGRICULTURE

4.1. Agricultural income

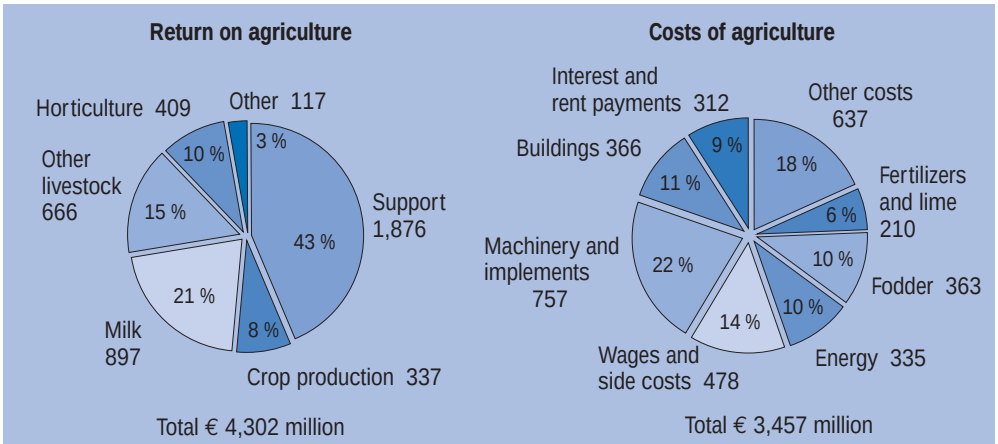
The returns and costs of agriculture and horticulture as well as the economic result are followed by means of an annual, cash-based total calculation made at the MTT. Income development is assessed through the concept of agricultural income, which indicates the compensation for farm family's labour and capital invested in agriculture. Agricultural income is calculated by deducting the total costs from the total return on agriculture.

In 2009 the total return on agriculture and horticulture was € 4.3 billion. The costs were a little over € 3.4 billion and the agricultural income, i.e. the difference between the two, totalled € 845 million. In the first years after the accession to the EU in 1995 the structure of the total return on agriculture and horticulture changed and the level of the total return fell. This was mainly due to the decrease in market return by half, while the amount of support payments almost doubled. The reduction in the input prices was not sufficient to compensate for the decrease in the total returns. As a result, agricultural income at nominal prices decreased by almost 40% to 890 million euros by 1998. After that there was some increase in agricultural income up until 2002, and since then the income has been falling steadily, apart from the exceptional year 2007. In 2008 the agricultural income at nominal price was the lowest since 1995. In real terms the agricultural income is only about a half of the pre-accession level.

The relative structure of returns on agriculture stayed about the same in 1995–2009. Return on crop production represents about 10%, return on livestock production 40% (milk alone 25%) and support payments about 45% of the total

Agricultural income at nominal and 2009 prices in 1994–2009e, € million.

Year	Total return at nominal prices	Total cost at nominal prices	Agricultural income at nominal prices	Agricultural income at 2009e prices	Annual change at 2009e prices, %
2009e	4,302	3,457	845	845	3.8
2008	4,521	3,707	814	814	–24.0
2007	4,304	3,276	1,028	1,070	11.1
2006	4,021	3,118	903	964	–9.0
2005	3,986	3,011	976	1,059	–9.7
2004	3,968	2,897	1,070	1,172	–4.7
2003	3,932	2,811	1,121	1,229	–3.3
2002	3,960	2,812	1,148	1,271	2.6
2001	3,900	2,798	1,102	1,239	4.2
2000	3,753	2,722	1,031	1,188	6.0
1999	3,520	2,579	941	1,121	4.4
1998	3,484	2,594	890	1,073	–17.7
1997	3,609	2,542	1,067	1,304	–3.6
1996	3,650	2,556	1,093	1,353	–12.7
1995	3,759	2,515	1,245	1,549	–12.4
1994	4,270	2,864	1,407	1,769	26.4



Return on agriculture and costs of agriculture in 2009e, € million.

return. In 2009 the return at market price fell by almost 10% from the year before to 1.9 billion euros. Return on crop production fell by more than a fifth in spite of the record yields of barley and wheat. Return on livestock production decreased by more than 7% due to the fall in milk prices and pigmeat production volumes.

The relative cost structure of agriculture did not change very much in 1995–2009, either. The material and equipment cost was, on average, 35%, except in 2008 when this accounted for 40% of the total costs because of the rapid rise in input prices. Depreciation costs have accounted for about 25% and other costs for 35–38% of the total costs. In 2009 the total costs were a little more than 7% lower than the year before. Almost half of this was due to the decrease in fertiliser cost and a little over a third resulted from the fall in fuel costs. Feed cost decreased considerably as well due to the fall in both the quantities used and the average price.

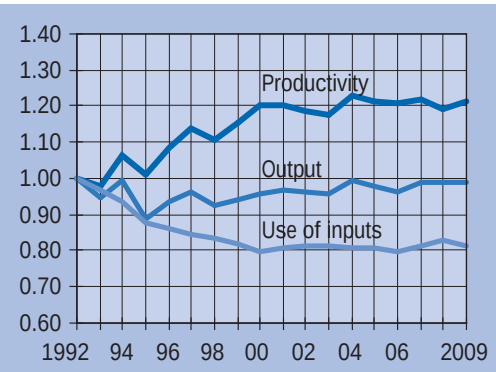
Horticulture has reinforced its position in the Finnish agriculture and horticulture sector. Return on horticultural production at market price rose by more than 40% in 1995–2009.

4.2. Productivity development in agriculture

Productivity means the ratio between the volume produced and the use of inputs. Productivity improves if the same use of inputs, such as arable land, labour and capital, yields a larger volume of output or if the same volume of output is achieved by means of less input. Improving productivity is important in terms of the competitiveness of the production, and together with input and output prices and support payments it is one of the main factors on which the profitability is founded. The predominating trend in Finnish agriculture has been that the production volume has been quite stable while the use of inputs has decreased mainly because of the rapid reduction in labour input. Growth in total factor productivity of agriculture is desirable from the consumer perspective because higher profitability has been observed to move further in the food chain for the benefit of both the trade sector and consumers. The calculation of the productivity trend based on the total calculation of agriculture shows, however, that in recent years the improvement in the productivity has remained quite modest.

In the national agricultural policy the objective concerning the development of

productivity has been written down as follows: "Agricultural policy creates the preconditions for efficient food production which meets the expectations of the consumers and respects the nature." In this chapter the productivity development of agriculture is measured from the total calculation of agriculture by means of the Divisia index method. This can be used to calculate the quantity indices for outputs and inputs, and the change in their ratio indicates the development of productivity, i.e. output-input ratio over the period concerned. The partial productivities of labour and capital are examined by comparing the volume of total production established by the Divisia index method with the labour input and capital input in turn. In addition, the productivity development of Finnish agriculture is compared to the agricultural productivity trends in the United States (http://www.ers.usda.gov/Data/agproductivity/).

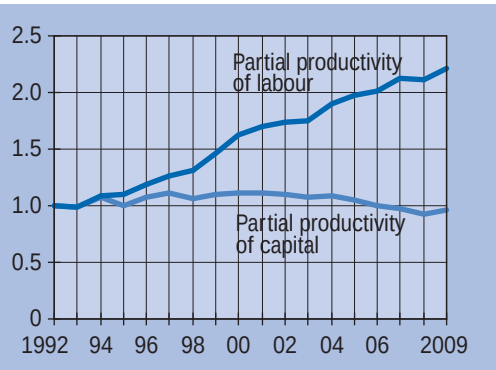


Productivity, output and use of inputs in 1992–2009 based on the total calculation of agriculture (the year 1992 indicated by 1).

As defined on the basis of the total calculation, in 2009 the same use of inputs in Finnish agriculture yielded an about 21.4% higher output than in 1992. The total output was 99% and use of inputs 81.6% of the levels in 1992. During this period the average productivity growth in agriculture was 1.15% per year.

The productivity of labour in Finnish agriculture has increased rapidly in the past 15 years, by the average of about 5% per year in 1992–2009. In 2009 the output volume per unit of labour input was 2.2 times that in 1992. During this time the total labour input decreased from 160,000 AWU (annual work unit) to about 70,000 AWU. In the long run there have been no major changes in the productivity of capital in Finnish agriculture.

It is often claimed that the productivity of Finnish agriculture has improved very slowly. This may not, however, be quite true, because the productivity trends of agriculture in Finland and in the United States over the past 15 to 20 years show surprising similarities. In 1996–2006 the productivity of agriculture rose by 21% in Finland and by 18% in the US. The development is, however, due to very different changes in the production and use of inputs. In Finland the output has been quite stable so that in 2006 the output was only 3–4% smaller than in 1992, and the productivity development has taken place almost solely through more efficient use of inputs and release of labour to other sectors. In the US the use of agricultural inputs was on about the same level in 2006 and 1992, while the output increased by 15.7%. Obviously the efficiency in the use of labour has improved in the US as well, but at the

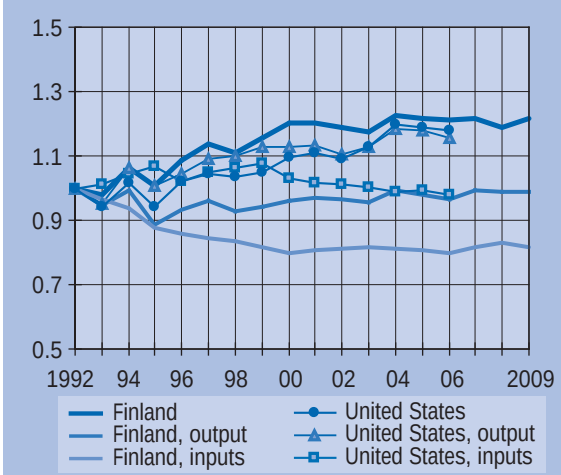


Partial productivity of labour and capital in 1992–2009 according to the total calculation of agriculture (the year 1992 is indicated by 1, 2009 = forecast).

same time the use of other inputs, such as machines and equipment, services and farms' own intermediate products has also increased to the extent that the total use of inputs has stayed about the same. The results show that achieving any rapid improvements in the productivity is now more challenging, both in Finland and elsewhere, than thought the so-called green revolution in the 1970s and 1980s.

In the past 15 to 20 years Finnish agriculture has not been catching up with the leading agricultural countries of the world as regards the difference in the level of productivity due to the unfavourable climate and small farm size. Despite the challenges caused by these permanent handicaps for productivity, Finland has reached a development path which for the most part corresponds to the trends in the great agricultural countries.

Now it has been observed that the slower productivity development is a global phenomenon, which very likely is mainly caused by the cuts in agricultural research funding. If making the same mistake can be avoided in Finland, we may be capable of deriving the maximum benefit from the decrease in the comparative disadvantage brought along by climate change, thus reinforcing the competitive position of Finnish foods on the food market, where the competition is very tough indeed.



Productivity, output and use of inputs in Finland and the United States in 1992–2009 (the year 1992 is indicated by 1, 2009 = forecast).

4.3. Development of results and profitability of agriculture and horticulture

The profitability of agriculture and horticulture declined in all main production sectors when Finland joined the European Union in 1995. The producer prices fell dramatically and the decrease in input prices and new support payments did not compensate for the decrease in the returns. On average the entrepreneurial income in the agriculture sector fell by 20% and the profitability coefficient decreased from 0.82 to 0.68. The results of cereal farms declined the most. Ever since, the trend in the economic results and profitability of Finnish agriculture and horticulture enterprises has been decreasing. In 2006–2008 the average entrepreneurial income of farms in real terms was € 23,300 per farm (at 2008 price level), which is 6% lower than the average income in the first years after the accession 1995–1997. Correspondingly, the profitability coefficient fell from 0.69 to 0.52. At present the entrepreneurial income covers, on average, only about a half of the costs of own labour and own invested capital. The profitability of cereal farms has weakened the most, the profitability of dairy farms has stayed close to the average, while pig husbandry farms seem to have succeeded better than the average.

Returns and costs

As a result of the decrease in the producer prices when Finland

joined the EU, the gross return of agriculture and horticulture fell from € 121,000 to 93,000, i.e. by 24%. The share of support payments in the returns increased considerably. Before 1995 sales proceeds accounted for more than 90% of the gross return while the share of support payments was less than 10%. During the EU period the share of sales proceeds in returns has decreased to about 60% and the share of subsidies has risen to 40%. In 2008 the gross return of agriculture and horticulture enterprises was € 128,000, of which € 47,000, i.e. 37%, was support. Support payments also include the investment subsidies allocated to the accounting years.

In 1995 the costs of agriculture and horticulture enterprises without the wage claim for farm families' labour and interest claim on equity fell from about € 91,000 to 68,000, i.e. 25%. Since then the costs have been rising more rapidly than the returns. In 2007–2008 the costs rose exceptionally steeply due to the increase in raw material prices. The energy, fertiliser and feed costs increased the most. As a result of the economic depression the input prices started to fall towards the end of 2008, which was reflected as lower costs in 2009. In 2008 the average costs per enterprise totalled € 109,000.

Income development

The entrepreneurial income (family farm income) of agriculture and horticulture fell from € 30,000 to 24,000, i.e. 20%, when Finland joined the EU in 1995. In the bad crop years 1998 and 1999 the entrepreneurial income was as low as € 19,000 per enterprise. During the 2000s the entrepreneurial income has stayed at an average of about € 23,000. The highest level, € 28,800, was reached in 2007 when the high raw material prices also led to a rise in the producer prices of agriculture, especially milk and cereal prices. The fall in the prices in 2008 and 2009 was equally dramatic. In 2008 the entrepreneurial income dropped to the lowest level in the 2000s, the average of € 19,300. On cereal and pig farms the income was less than a third from the year before. Even in 2007 the entrepreneurial income did not reach the level before joining the EU, and in 2008 it was more than € 5,000, a fifth, lower than in the first years of the EU period

The labour input of farm family in agriculture and horticulture has decreased from 3,500 hours per year at the time when Finland joined the EU to the current 2,400 hours. The number of working hours has fallen by about 3% a year, partly due to the decrease in the number of livestock farms. In 1995–1997 the cost of farm family's own labour, i.e. wage claim, was about € 28,600 and in 2008 the average of € 31,800 per enterprise. The wage claim has been calculated by multiplying the working hours of the farm family recorded in the labour bookkeeping with the average hourly wages of agricultural employees.

The amount of equity (own capital) has increased from € 140,000 in 1995 to the current € 260,000. The interest claim on equity, calculated according to a rate of 5%, has risen from € 7,000 to the current about € 13,000. The growth in the size of enterprises has increased the amount of equity and the interest claim on this, but the rise is also partly due to the changes in the valuation methods of capital assets and introduction of price indices in calculating the values in the balance sheet.

The sum of the wage and interest claim has increased from € 36,000 in the beginning of the EU period to € 45,000. When this is deducted from the entrepreneurial income, we arrive at the entrepreneurial profit, which has been negative during the whole period. In 1994 the loss was about € 6,400, and it doubled in 1995, when Finland joined the EU. In 2006–2008 the entrepreneurial loss was, on average, as high as € 22,000 per farm. The returns should be this much higher or costs lower in order that the farm family would receive a com-

pensation for own resources that would meet the wage claim and a 5% return on equity. The total amount of losses per farm accumulated over the time Finland has been in the EU is about € 250,000.

Profitability development

When entrepreneurial income is divided by the sum of wage and interest claim we arrive at the profitability coefficient, which as a relative profitability indicator. The profitability coefficient has fallen from 0.7 at the beginning of the EU period to the level of about 0.5 in 2006–2008. In 2008 the profitability coefficient was the lowest since 1995, 0.44. This means that entrepreneurial income covered only 44% of the wage and interest claim, i.e. the average hourly wage to the farmer was € 5.7 (return on labour) and a 2.2% interest on equity.

Of the main production types the profitability coefficient of dairy farms fell the least when Finland joined the EU and since then their profitability has been quite stable. The trend, however, has been decreasing all through the EU period. Thanks to the high producer price of milk, in 2007 and 2008 the economic results of dairy farms turned into a rise, after having decreased in the previous couple of years. In 2006-2008 the average profitability coefficient was 0.57 and in 2008 it rose to 0.62.

The profitability of pig husbandry has usually been above the average of the agriculture sector. In 1994 the profitability coefficient was 1.08 and it fell to the level of 0.8–0.9 when Finland joined the EU. In the early 2000s the profitability was still quite good, but since then it has been declining. The price ratios and market cycle in the sector cause considerable variations in the results of pig farms. The rapid increase in the costs caused the profitability of pig farms to collapse in 2008 so that the profitability coefficient fell to a record low level of 0.24.

The profitability coefficient of cereal farms fell from 1.0 to 0.7 when Finland joined the EU, and the declining trend has continued since then. The year 2007, when the cereal prices doubled, is a clear exception in the development. The prices fell back by the next crops season, which caused the profitability to collapse so that in 2008 the profitability coefficient of cereal farms was as low as 0.26. The decrease in the producer prices has further weakened the profitability of cereal production and the bad crop years during the period have increased the annual variation.

Measured by the return on total assets agriculture has not yielded any return on the total capital invested since Finland joined the EU in 1995. The return on assets was a few tenths above zero only in 2000 and 2001, while in all other years the figure has been negative.

During the years Finland has been in the EU the trend in profitability has been decreasing in all subsidy areas. In 1995 the profitability fell more in subsidy areas A and B in southern Finland than in area C, but in the first years in the EU there were no big differences in profitability between the subsidy areas.

Since 1995 the profitability coefficient in subsidy area A has varied between 0.2 and 0.9. The quite large variation is due to the big share of cereal farms in the area, as the profitability of cereal production depends a great deal on the natural conditions. In subsidy area B the profitability has been about the same as in area A, but there has been far less variation between the years.

In subsidy area C1 the profitability coefficient has fallen from 0.6 in the mid-1990s to 0.50 in recent years. In area C1 the profitability has decreased slightly more than in the other northern areas. In recent years the profitability in areas C1 and C2 has been about the same, in subsidy area C3 it has been a little higher and in area C4 a little lower than in the other subsidy areas. The profitability of agriculture in

different areas is considerably influenced by the differences in the structures of production and enterprises.

Profitability forecast

According to forecasts the profitability of agriculture and horticulture continues to decline. Some improvement is expected in the profitability of pig husbandry and beef production due to the decrease in the price of purchased feeds, but the profitability of cereal production is going to fall close to zero. The decrease in the prices of inputs is not sufficient to compensate for the losses due to the fall in the producer prices. The average profitability coefficient of agriculture and horticulture is expected to fall from 0.43 to 0.40.

The forecasts are based on farm-specific forecasts for 2009 made for about 1,000 bookkeeping farms which take account of the changes in input and producer prices, support payments and regional average yields of different crops.

Solvency

Structural development in agriculture has been rapid since 1995, when Finland joined the EU. The growth of farm size has been seen as an important means for maintaining the preconditions for profitability. Capital resources have been supplemented by liabilities, which has increased the amount of debts. Since 1995 the total amount of capital per enterprise in real terms has doubled to € 370,000. Besides the growth of farm size, the amount of capital has increased due to changes in the valuation of assets. Since 1998 the capital assets in the balance sheet have for the most part been valued at the market value.

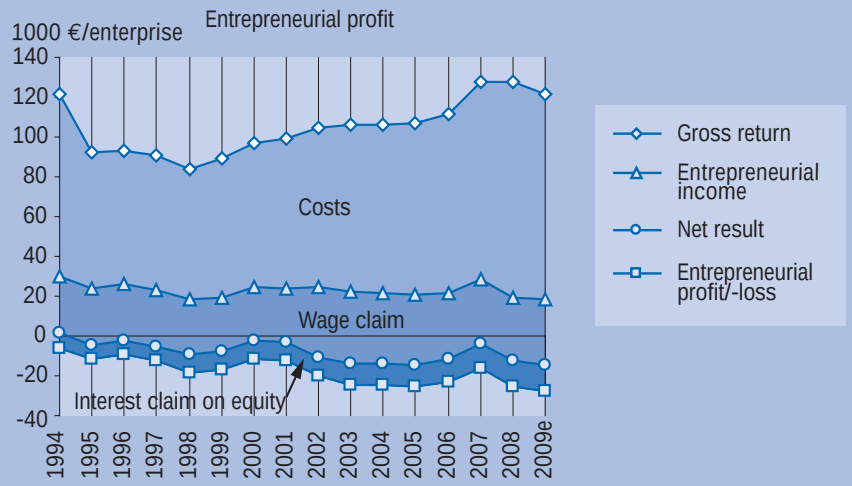
In the first years of the EU period the amount of liabilities per enterprise in fact decreased, but especially in the 2000s the growth in debts has exceeded the increase in equity. In 2008 the debts totalled about € 100,000 per farm. Due to structural development the debts of expanding farms have accumulated to very high levels. On average the capital structure of enterprises is still good and the equity ratio, i.e. the share of equity of total capital, has been 70–75% during the EU period. In agriculture the amount of capital relative to returns is much higher than in many other sectors. The slow capital turnover weakens the return on assets in agriculture, which requires better solvency than that given in standard guidelines.

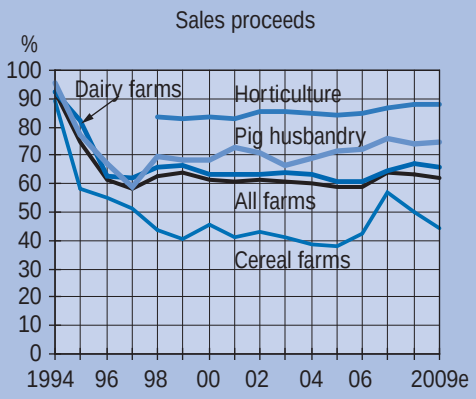
No return on equity

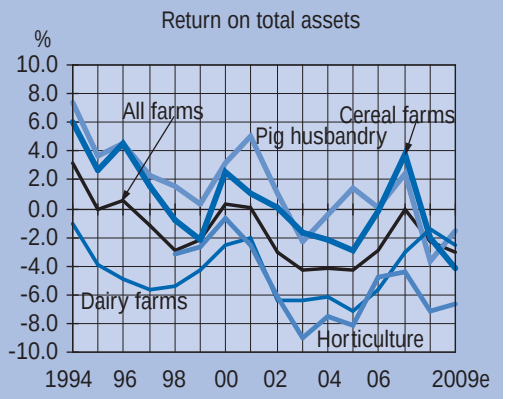
The net result left as the return on equity (own capital) in agriculture and horticulture turned negative when Finland joined the EU. In 1995–1997 the average net result was € –3,900. In 2008 the net result was € –12,400. The return on equity has been negative all through the EU period, falling from –3% in the first years to the recent –4%. Thus there has been no return on equity and farmers have also gone short much of their wage claim.

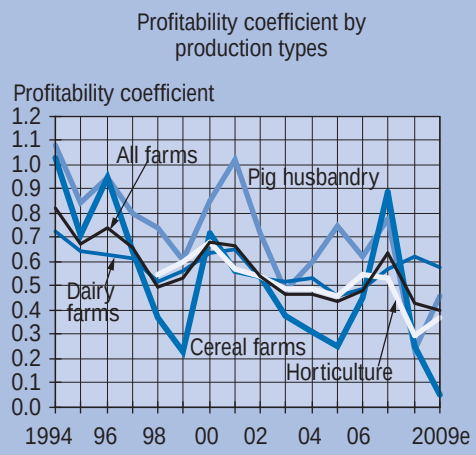
Hourly wages of farmers

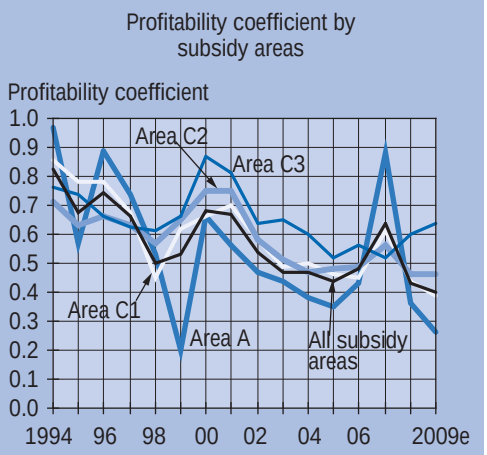
The hourly earnings of farmers which can be compared with the earnings of employees in other sectors is obtained by deducting the interest claim on equity from the entrepreneurial income and dividing the remainder by working hours. The hourly earnings have fallen from € 7 in the first years in the EU to € 4–5. In 2008 the hourly earnings were as low as € 2.6 and on e.g. cereal and pig farms the farmers received no earnings for their own work. During the first years in the EU the hourly earnings of farmers were about 60% of the average hourly wages of agricultural employees and 40% of the wages of industrial workers. In recent years the hourly earnings of farmers have been only a third of the average wages of agricultural employees and a fifth of the wages of industrial workers.











Result and profitability development of agriculture and horticulture enterprises in 1994–2009e.

5. AGRICULTURE AND THE ENVIRONMENT

Modern societies direct various kinds of expectations to farming. Apart from the production of staple foods to meet the domestic consumption, agriculture should contribute to, for instance, the maintenance of managed and open farming landscapes, biological diversity and rural viability. The significance of environmental commodities as the products of multifunctional agriculture has been growing since Finland's accession to the EU in 1995, while the income from producing staple foodstuffs has mainly been decreasing. The rapid increase of crop prices in 2007 weakened the relative competitive position of the public goods produced by agriculture and increased the challenges for the agri-environment policy. Now we are back on the level before the price peak.

During 2009, the discussion on agri-environment policy centred around the new environmental protection guide for animal husbandry and its implementation and supplementing the Rural Development Programme for Mainland Finland 2007–2013. The Rural Development Programme includes the agri-environment scheme, which is the main EU instrument for the environmental policy of agriculture. The scheme is mandatory for all Member States, and the main goals are to reduce loading on surface waters and groundwater, reduce emissions to the air, protect the biodiversity of farming environments, and manage the cultural landscapes.

In Finland, the agri-environment support is the largest item in the state expenditure on environmental protection. A total of one billion euros a year is used for environmental protection, of which the agri-environment payments represent about a third. Thus, it is no wonder that the agri-environment support arouses passions among actors outside agriculture as well.

Water management plans under the EU's Water Framework Directive were finalised during 2009. The aim of the Directive is to protect, improve and restore waters so that their chemical and ecological status is good in the whole EU area by 2015. In Finland, the agri-environment scheme is highly important in the implementation of measures required under the Water Framework Directive. Means to circumvent the requirements and timetables of the Directive are, however, already being searched for.

5.1. Environmental impacts of agriculture

Besides food production, agriculture has an important role in maintaining biodiversity and as a producer of rural landscape and recreational services. In addition to the positive effects, however, agriculture has also negative impacts on the environment, i.e. the soil, waters and air.

Soil

Soil is one of our most important natural resources: most of the nutrition consumed by humans derives either directly or indirectly from the land. Only about 7% of the surface area of Finland is arable land. Environmental loading from arable land depends on the soil type, cultivation properties and crop rotations. As regards crop production, in the Finnish soil there are no heavy metals, average phosphorus levels are satisfactory, acidity is increasing, and the amount of organic matter is decreasing. Besides these mainly chemical indicators, there are a number of biological and physical phenomena to be taken into account when assessing the ability of the soil to mitigate environmental loading. These include the numbers of soil organisms, activity of symbiotic microbes and binding and release of nutrients in soil organic matter.

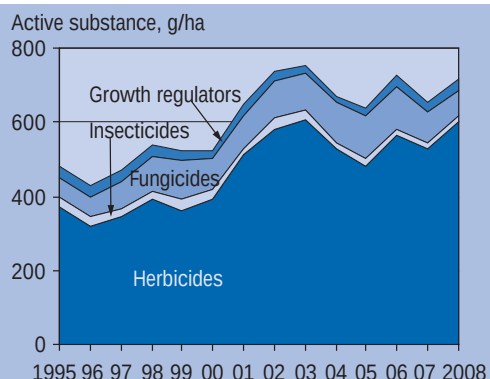
The widely discussed phosphorus level in arable land is an indicator of both its productive capacity and environmental loading. The phosphorus levels of Finnish arable lands have been rising up to the present, even if phosphorus fertilisation has been considerably reduced through, for example, the agri-environment scheme. At present, the increase in phosphorus through purchased fertilisers is already less than 5 kg/ha, which is only a quarter of the level in 1995. The amount of phosphorus entering the land in animal manure (about 8 kg/ha) is now higher than the amount of phosphorus contained in purchased fertiliser, and no significant reduction has taken place in this since 1995. Based on recent studies, total phosphorus fertilisation (purchased fertiliser + manure) could be further reduced to some extent without a decrease in yield levels, except in parcels where the phosphorus levels are particularly low. In the light of current knowledge, turning the phosphorus balance into a negative one is the most efficient way to achieve a permanent reduction in phosphorus loading.

The use of pesticides began to increase in Finland towards the end of the 1990s after a long downward trend. The main reason for this was the increased cereal cultivation and wider use of no-tillage technology. Farmers have also switched over to pesticides which need to be used in larger doses. On the European scale, however, the quantities of pesticides used in Finland are still quite moderate. The ownership of arable land is quite decisive in terms of the long-term productivity of the land. Studies have shown that much less land improvement work is being done on leased areas than on lands owned by the farmer.

Loading of waters

Agriculture is still the greatest single source of nutrient loading on waters caused by human activity. Loading is caused by both arable farming and livestock production. Now that the direct discharges from livestock buildings have all but stopped, the focus in nutrient loading from agriculture has shifted to arable farming. Because of the concentration of livestock production, the amount of manure produced is excessive in many places relative to the utilised agricultural area and the needs of the crops cultivated on this. The phosphorus contained in manure, in particular, has become a problem. The Finnish Environment Institute estimates that at present about 50% of the nitrogen loading and 60% of phosphorus loading comes from agricultural sources. In the nutrient loading of the Baltic Sea, Finnish agriculture accounts for about 3.8% of the phosphorus and 3.7% of the nitrogen loading. In the loading on the Archipelago Sea and coastal waters, the share of Finnish agriculture is much greater.

Nutrients leach to ditches, rivers, lakes and the sea from arable land, causing eutrophication. This can be seen from the turbidity of the water, increase in the algae and the mass blooming of toxic blue-green algae in the summer. Although the emissions have been reduced, the eutrophication of waters continues and no improvement in the state of waters has been observed.



Use of pesticides (active substance g/ha). Source: Information Centre of the Ministry of Agriculture and Forestry.

The load on waters from arable farming depends on the soil structure as well. Soil compaction reduces the permeability of the soil, which increases the risk of nutrient surface runoff and erosion. It also weakens the nutrient intake of plants, which lowers the utilisation rate of nutrients. Poor permeability may also increase the release of greenhouse gases.

Emissions to the air

Climate change poses new challenges to Finnish agriculture as well. The measures to adapt to climate change are changing the relative profitability of different crops and production methods. Climate change is also influenced by agriculture. Greenhouse gas emissions from the agricultural sector represent about 7% of the total emissions in Finland. Since 1990, the emissions from agriculture have decreased by about a fifth as a result of the decrease in agricultural production. In relative terms, the emissions from agriculture have decreased even more since the total emissions from other sectors have grown.

Most of the greenhouse gas emissions from agriculture are due to the digestion of ruminant livestock, the decomposition of organic matter in the soil and the decomposition of manure. Minor emission sources include nitrogen fertilisation, the liming of arable lands and the use of fossil energy in agriculture. A common feature in all emissions from agriculture is that it is difficult to reduce them without significant impacts on the volume of agricultural production. Through agri-environment measures, efforts are made to transfer peaty arable lands from continuous cereal production to the cultivation of grasses on a long-term basis.

Biodiversity of farming environments

Biological diversity comprises the abundance of species, diversity of habitats and intra-species genetic diversity. The decline in biodiversity is considered a serious environmental problem because biological diversity is the foundation for the functioning of ecosystems and ecosystem services (i.e. benefits to humans derived from nature). Without biodiversity, the ecosystems are not capable of adjusting to changes in the environment, such as climate change.

Agricultural production is based on the utilisation of biological diversity. Similarly, many wild plant and animal species have over centuries adjusted to utilising agricultural environments created by man. The positive impact of agriculture in enhancing biodiversity was the greatest at the time when feed was produced on meadows and natural pastures. The growth in the farm size since the 1950s together with increased input intensity and farm-specific and regional specialisation has led to a decline in the biodiversity of farming environments and increased the numbers of threatened species and habitats.

For some wild species, changes in their habitats due to new and more efficient production methods have been too rapid and they have not been capable of adjusting to the new conditions. Especially organisms which depend on meadows and forest pastures have declined and become endangered due to the decrease in grazing and cattle husbandry. According to an assessment of threatened habitats completed in 2008, the highest share of threatened habitats in the total number of habitats of a certain type is found in traditional biotopes, of which 93% are threatened.

However, in habitats maintained by agriculture there are still numerous wild plant and animal species which benefit from farming activities, open arable areas and grazing livestock, as well as many of the measures relating to the agri-environment scheme and non-productive investments.

5.2. Agri-environment regulation

Environmental protection in the agricultural sector is regulated by both national and international environmental legislation. National regulation includes, among others, environmental permits and waste legislation. The EU environmental legislation related to agriculture includes Habitats and Birds Directives, Natura 2000 network, Nitrates Regulation issued under the Nitrates Directive and Water Framework Directive. The Act on Water Resources Management adopted in 2004 implements the Water Framework Directive in Finland.

After the implementation of the latest CAP reform and start of the programming period 2007–2013 the concept of multifunctional agriculture is still topical. Decoupling support from production and the new single-payment scheme introduced the concept of cross-compliance, according to which agricultural land must be maintained in good agricultural and environmental condition. Recently, it has been suggested that some of the measures now included in the agri-environment scheme should perhaps be included in the cross-compliance conditions binding on all farmers.

The main objective of the agri-environment scheme is to reduce the load on waters, which is why most of the support is directed to measures which contribute to water protection, while only about 2–3% of the support is used for measures which are primarily targeted at enhancing biodiversity. The role of the agri-environment payments in enhancing biodiversity is, however, somewhat greater, because certain measures that are primarily targeted at water protection, such as headlands, filter strips, and riparian zones, also contribute to biodiversity.

Agri-environment policy is faced with pressures due to changes in both the society and the environment. The agri-environment scheme and overall increase in environmental awareness have shaped farmers' attitudes. Consumer awareness has grown, resulting in pressures on the EU to reform its agricultural policy to respond to the public opinion. On the global scale, meeting the obligations relating to the WTO binds the EU to review the support payments to agriculture. In the plans for the post-2013 agricultural policy the grounds for arable area payments are shifting more towards the production of environmental benefits.

5.3. Agri-environment payments in 2007–2013

The European Commission approved the Rural Development Programme for Mainland Finland 2007–2013 in August 2007. Rural development is funded from the European Agricultural Fund for Rural Development (EAFRD) and from national sources. The total public funding for the seven-year programming period is about €6.6 billion, of which a third comes from the EU. The programme has four axes, of which Axis 2 includes the agri-environment and natural handicap payments, non-productive investments and promoting the welfare of production animals. The funding for Axis 2 totals about €2.3 bill.

The measures of the third agri-environment scheme introduced in 2007 are very similar to those in the two previous programmes. The scheme consists of basic, additional and special measures. There are certain changes from the previous programming period concerning e.g. the reference state from which the costs and income losses to be compensated for are calculated, minimum requirements for the use of pesticides and fertilisers, commitment periods and target beneficiary groups. Farms in support areas A and B must undertake the basic measures plus one to four additional measures. In area C, no additional measures are required, and no more than two may be undertaken. The most popular additional measures have been more accurate nitrogen fertilisation of ar-

able crops, different forms of plant cover on arable land in winter and calculation of nutrient balances. The number of farms included in the agri-environment scheme decreased slightly from the previous programming period, but it still covers more than 95% of the arable area.

After the approval of the Rural Development Programme for Mainland Finland, the revision and development of the agri-environment scheme continued in a working group on amending the agri-environment scheme. In 2008, three new special measures were included in the agri-environment scheme: incorporation of liquid manure into the soil, long-term grass cultivation on peaty arable lands and more efficient reduction in nutrient loading.

The special measure concerning nature management fields was included in the programme in 2009. It was designed to compensate for the losses in nature and environmental values due to the abolition of compulsory set-aside from the single payment scheme. Nature management fields may be under perennial grasses (support 170 €/ha) or biodiversity fields (support 300 €/ha), which include game and landscape fields and fields sown with mixed seed of meadow plants. Support for nature management fields may be paid for the maximum of 15% of the total arable area of the farm eligible under the agri-environment scheme. In view of the current oversupply on the cereal market, nature management fields are an economically competitive alternative for farmers who are committed to the agri-environment scheme compared to the cultivation of fodder cereals. According to preliminary data from the Information Centre of the Ministry of Agriculture and Forestry, in 2009 the total area of nature management fields was more than 130,000 ha, of which 80% was under perennial grasses.

The changes to the special measures in 2010 include the following: The geographical area eligible for the contract concerning multifunctional wetlands was extended. Entering into the contracts was enabled for the catchment areas of rivers discharging into the Kvarken and Bothnian Bay. The site-specific support for the management of small valuable traditional biotopes (0.3–0.5 ha) was raised to 200 €/year from the earlier 135 €/site. The limits for the maximum acceptable costs of the contracts concerning special measures were raised (Annex 2 to Government Decree 46/2010).

In 2010, the maximum amount of support for non-productive investments concerning the establishment of multifunctional wetlands was raised to 11,500 €/ha and the area covered by the measure was also extended to the catchment areas of rivers discharging into the Kvarken and Bothnian Bay. In small wetland sites (0.3–0.5 ha), the amount of investment aid is fixed at 3,226 €/site. Support for non-productive investments in the first clearing and fencing of valuable traditional biotopes was differentiated according to the surface area of the biotopes. The amount of the investment support is 1,179 €/ha for sites with the maximum area of 3 ha, 910 €/ha for sites of no more than 10 ha and 750 €/ha for sites of more than 10 ha.

In accordance with the Leader methodology, support for non-productive investments in the establishment of multifunctional wetlands and first clearing and fencing of traditional biotopes and support for the special measures concerning the management of multifunctional wetlands and traditional biotopes may also be granted to beneficiaries other than farmers. This is very likely to extend the measures to cover new areas.

Winter cereals will be approved to fulfil the condition concerning plant cover in winter as from the winter season 2010–2011, and the measure concerning nutrient balances, in one form or the other, will be included in the basic agri-environment measures as from 2012. In the future, some of the requirements now included in the basic measures (such as field margins and filter strips) will probably be transferred to

the cross-compliance conditions.

Evaluation of the agri-environment scheme and its impacts

The study on the impacts of the previous agri-environment scheme again raised the question how efficient the environmental payments really are. In the ex post evaluation of the second programming period, it was stated that the agri-environment payments had failed in terms of the objectives set for it. However, these objectives were also considered somewhat unrealistic, especially if proportioned to the means employed. The high participation of farmers, about 95%, was considered a success. As a means for improving the agri-environment scheme, the evaluation proposed a basic programme intended for all farmers, combined with more efficient measures customised for each farm.

Based on the results of the follow-up studies on the impacts of the Finnish Agri-Environment Programme (MYTVAS), the agri-environment measures have contributed to the preservation of biodiversity and open farming landscapes. In spite of this, the actions taken so far have not been sufficient to stop the long continued impoverishment of farming environments. Agri-environment measures also tend to suffer from inefficiency relative to the amount of funds used.

The National Audit Office of Finland presented its own view of the relatively small environmental impacts of the scheme in the autumn of 2008 and suggested in its report that e.g. the cultivation of steep fields located on the shores should be stopped completely.

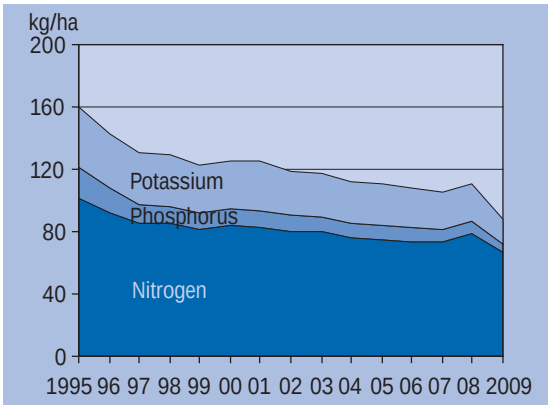
5.4. Water protection

According to the Government Resolution on guidelines for water protection issued in 2006, by 2015 nutrient loading from agriculture should be reduced by at least a third from the average in 2001–2005 (phosphorus by 3,000 t/a and nitrogen by about 30,000 t/a). These objectives continued the work done to reach the reduction target of 50% by 2005, which failed. The planning and implementation of water protection in agriculture needs to be further improved as the Water Framework Directive sets even more detailed quality standards for specific water areas.

The objective of the Water Framework Directive is to prevent the decline in the status of surface waters and groundwater, guarantee a good status of waters by 2015, restrict the entry of harmful substances to waters, and reduce the damages caused by floods and drought. The Member States are obligated to ensure that these objectives are met in each water area. Finland is divided into eight water management areas, and detailed water management plans have been prepared for each of these. The classifications of surface waters and groundwater were completed in 2008. In the spring of 2009, they were circulated for comment to allow the citizens to give feedback on the planned actions. The plans were then finalised and their implementation by the Regional Environment Centres got started.

What do the objectives mean for agriculture?

Nutrient loading from agriculture is non-point source loading from over a million agricultural parcels with highly varied characteristics. Besides the physical characteristics, such as slope and soil type, the water loading from parcels depends on the weather conditions and cultivation and tillage practices. In Finland, the calculation of loading is founded on a monitoring system established in 1957, which has since then been developed to make it better suited for the monitoring of nutrient loading. At present, the system covers 253 sites, 211 lakes and 5 artificial lakes, and it will be further developed to take the ecological properties better into account. According to the Directive, the assessment of the status of



Use of fertilizers (kg/ha). Source: Information Centre of the Ministry of Agriculture and Forestry.

waters takes place by comparing the current status with an estimated natural state.

As fertilisation is one of the principal factors in nutrient loading, it is also used as an indicator of the loading potential. In 1995–2009, the fertiliser sales per hectare of cultivated land decreased from 92.3 kg to 67.1 kg for nitrogen and from 16.1 kg to 5.3 kg for phosphorus. During the same period, there was no decrease in the yields per hectare, which means that the nutrient balances improved considerably. The trend is correct considering both the efforts to reduce nutrient loading and the profitability of agriculture. However, we should bear in mind that the average per hectare may hide highly varied quantities of fertilisers, whose loading potential may be manifold in parcels which are susceptible to erosion. Certain risk areas load the waters much more than the average. In Finland, 90% of the loading occurs outside the growing season, which means that it is important to consider what happens between the harvesting and sowing. The development is also going in the right direction in this respect, because the agri-environment scheme and legislation have increased plant cover in winter, which reduces erosion, and less manure is spread on the lands in the autumn.

Now that the agri-environment scheme as the most important environmental policy instrument for agriculture has been in place for 15 years and water protection targets are set for specific water bodies, we can see that the current trend in the loading potential will not be sufficient to reach a good status in water areas where the loading from agriculture is the strongest by 2015. Especially as regards phosphorus, the soil reacts very slowly to changes and even significant reductions in the annual nutrient balance are not immediately reflected in the loading. The concentration of livestock production and growing unit size make it difficult to meet the objectives in certain regions. Transporting manure is costly and the decisions on spreading are often made based on the lowest cost or the need for nitrogen, which means that phosphorus levels may be too high for the plants and the loading potential increases. The pressure to improve the profitability of agriculture pushes towards more efficient production and larger units. A new threat to water quality is climate change, which is expected to increase precipitation especially outside the growing season.

5.5. Main topics and future perspectives

Natural values trading in agriculture

Natural values trading by competitive tendering has been suggested as an alternative to the present agri-environment scheme or to supplement it. Through natural values trading, the farmers or other agricultural operators themselves would propose to undertake measures that have been proven good and are suited to the specific areas to promote water protection, biodiversity or other protection and conservation of agricultural environments and present a bid for the implementation of these measures to the competent environmental authority. The authority would process the bid and accept or reject it based on commonly

approved criteria and available funding. A similar system is already being applied in the environmental protection in forestry, and in some countries also in agriculture (e.g. USA).

Manure and its processing

Now that the Commission has assumed a negative position on the continuation of the manure spreading contracts concluded in the previous programming period, solutions to the manure problem have been sought from various measures, including the application of a similar mechanism as in carbon dioxide emissions trading. In manure trading, quotas would be established for operators who produce and use manure, under which manure could be transferred from one place to another. Due to stricter environmental regulations, manure has become the most restrictive factor for the growth in the unit size of many farms, which is why other solutions for using and processing manure are being searched for from biogas production or use in plaster, separation and incineration. MTT Agrifood Research Finland has launched a manure research programme financed by the Ministry of Agriculture and Forestry to find solutions to these problems. Another problem is that in the EU legislation animal manure has been defined as waste, which has impacts on e.g. burning manure. The smoke gases from the incineration process must be analysed and any impurities must be removed, which is why burning manure in farm-scale incineration plants is not an economically feasible option.

Cost-efficient emissions reduction in the Baltic Sea

Each year the blooming of blue-green algae makes headlines during the best swimming season. Based on the latest research results, the most efficient way of improving the state of the Gulf of Finland and the Archipelago Sea would be to improve the purification of the wastewater discharges in the major emissions sources, such as St. Petersburg and cities in Poland. Investments in the treatment of the unpurified wastewaters from St. Petersburg per kilo of nutrients removed would also be more cost-efficient than reducing the loading from Finnish agriculture in the coastal areas of the Gulf of Finland. However, local cuts in the load to the Gulf of Finland would be more rapidly reflected in the sea water quality than the impacts of the cuts in the catchment area of the Main Basin of the Baltic Sea. Thus, cutting the emissions in Finland is important especially for our own coastal waters. External nutrient loading to the Gulf of Finland relative to the surface area is two to three times the average loading of the Baltic Sea.

In 2009, a study on the application of the so-called Stern model to managing the loading to the Baltic Sea got started at MTT Agrifood Research Finland. According to the pre-study, it would be cost-efficient for Finland to reduce its own loading only if the other, large-scale polluters (Russia, Poland, Sweden) would act in the same way. The loading from Finnish territory is significant enough, and the share of other polluters is small enough, to make any emissions reduction actions by Finland cost-efficient only in the loading of the Bothnia Bay.

High nature value farmlands

The first national survey of the number and location of the so-called high nature value farmlands (HNV areas) in Finland was completed in 2009. The share of high nature value farmlands is among the indicators followed in the Rural Development Programme for Mainland Finland. High nature value farmlands are characterised by the large share of cattle farms and natural pastures and extensive arable farming.

According to the municipalities, the most significant areas as regards farmland nature are on the Åland Islands and in the

south-western archipelago and Oulu region. Towards the north and inland the nature values of farmlands, on average, tend to decrease. An indicator which works on the farm level was also developed in the project to allow the monitoring of future trends in high nature value farmlands. In terms of individual farms, the regional distribution of high nature value farmlands is about the same as by municipalities, except that such areas are also found in South and North Savo, where cattle husbandry is the dominant sector.

Invasive alien species

Invasive alien species mean species which have been spread by human action. They have been transported to our country e.g. via freight traffic. Some of the alien species have been imported intentionally as ornamental plants, game animals or for fish farming purposes. The majority of the more than 600 invasive alien species established in Finland pose no threat to the original species, but certain alien species are known to cause serious ecological and economic damage. According to a preliminary inventory, there are altogether 120 harmful invasive alien species in Finland, most of these diseases and pests affecting agriculture and horticulture.

The UN Convention on Biological Diversity (UNCBD) obligates the states to prepare national strategies or programmes concerning invasive alien species. In Finland, the preparation of a national strategy for invasive alien species was launched in the autumn of 2008, coordinated by the Ministry of Agriculture and Forestry. The national strategy and action plan for invasive alien species should be completed by the end of 2010.

Other topics related to load from agriculture

The Ministry of the Environment published a set of guidelines for environmental protection on livestock farms in 2009. The very strict recommendations for manure spreading, in particular, aroused wide criticism among farmers. In the recommendations, e.g. the area required for spreading chicken manure was doubled from the earlier recommendation. This has made the incineration of manure an increasingly attractive option on poultry farms, as well as on horse farms.

Various scenarios have been presented for agriculture as regards climate change mitigation and adaptation. In some scenarios, Finland and North-East Europe have even been envisaged as the future European granary instead of Central Europe, which is expected to suffer from heat and drought. Certain scenarios envisage good prospects e.g. for the cultivation of fruits. Some studies, however, have shown that the present varieties are going to suffer serious yield damages rather than benefit from the expected growing conditions. Evidently adaptation to climate change requires far greater structural changes in agriculture than has been expected so far, instead of changes in the species and varieties alone. A new kind of thinking is needed in the whole food chain for mitigating climate change through actions by the sector.

To mitigate climate change, carbon dioxide created by the use of fossil fuels should be removed from the atmosphere. Increasing the carbon content of arable soils either by additions of organic carbon (e.g. direct sowing, long-term grass cultivation or other organic material) or through very slowly decomposing biocharcoal has been suggested as one way to do this. The carbon content of the soil can be increased by placing wood charcoal or biocharcoal (originating from organic material other than wood) into the soil. Wood charcoal is produced e.g. in the production of wood-based biofuel as a by-product of the pyrolysis reaction.

Great challenges in the manure management

Janne Helin

Sustainable use of nutrients contained in animal manure, especially phosphorus and nitrogen, is the key to reducing nutrient loads from agriculture. Problems with nutrients in manure usually arise in areas where livestock production is concentrated. Such concentrations are usually created due to the benefits of scale, i.e. the larger number of animals does not increase the need for labour in the same proportion and there is more income left to the farmer. Increasing livestock numbers is also promoted through investment aid. The development of feed industry and imported fodder have made livestock farms less dependent on arable land. Use of feed specifically customised for each farm increases the output while less labour input from the farmer is needed for feed production.

Support schemes steer the behaviour

Once arable area is no longer a necessity for producing feed for livestock, the acquisition of land becomes a profitability issue. The profitability of land acquisition is not only dependent on the livestock farms of the region, but farms specialised in plant production have a great impact on the price of arable land. Because both the EU and Finnish agricultural support schemes are based on the arable area, even quite a small input in cultivation provides the owner of the arable land a reasonable flow of income through support payments. The support payments are strictly bound to the existing arable area, which is why clearing new arable land is often no longer profitable for expanding livestock farms. Furthermore, the support schemes encourage arable land owners working outside agriculture to hold on to their arable area and to lease or sell it at a high price.

Thus the public support schemes actually weaken the possibilities of livestock farms to acquire enough arable area needed for manure spreading. This means that there is a lot of animal manure to be spread per hectare and it contains more phosphorus than most of the cultivated plants are capable of utilising. Over the years phosphorus is accumulated and stored in the soil so eventually the limits which depend on the soil soluble phosphorus, under the agri-environment support are reached. The mutually conflicting support schemes make the proper running of a farm an unnecessarily complicated task.

Clear incentive for excessive phosphorus fertilisation

Taking manure away from the farm would mean that nutrients are also transferred from own production. Thus the valuable nitrogen fertiliser with a clear yield response would also be lost, even if the additional phosphorus would no longer increase the output. Especially when the price for nitrogen in artificial fertilisers is high, taking manure away from the farm is costly to the farmer and there is an obvious incentive for excessive phosphorus fertilisation. Plant-specific restrictions for high phosphorus level under the agri-environment scheme would prevent excessive fertilisation, but the derogation concerning manure granted to livestock farms mitigates or even annuls the significance of these basic restrictions of the environmental scheme in plant production.

When the feed prices are low due to, for example, poor quality crop that is unfit for

processing into foodstuffs or cheap excess supplies on the world market, animal feeding with abundant nutrients is profitable for increasing the output levels of livestock. Part of the higher nutrient levels end up in manure, which means that low-priced feedingstuffs also contribute to lower fertilisation costs on livestock farms.

When plant production is partly practised only with the aim of receiving the area-based payment, with a minimum use of inputs, there is a higher risk of producing a weak quality crop. What is created is a vicious circle, where the economic incentive for transferring animal manure from livestock production to plant production diminishes even further. Thus it would in fact be in the economic interest of the livestock producers to demand a sufficiently strict agri-environment scheme, as long as the derogation granted to nutrients spread in manure is retained.

What should be done?

Abolishing the derogation concerning the conditions for spreading manure from now on would be a straightforward measure to improve the situation. Livestock farms should either acquire more arable land, despite the fact that the area-related payments have made this very costly, or conclude a contract on fertilising arable parcels owned by less intensive farms. Another alternative would be to apply some other manure treatment method that is acceptable for the environment.

Any kind of processing involves costs and there is still phosphorus, in one form or the other, left in the end product. At least for the present the most natural destination for this phosphorus is still arable land. Processing may increase the profitable transportation distances, but pushing the processing costs to the level of savings achieved in transportation costs is a very challenging task.

Recent media coverage on incineration of horse manure has sparked a debate on the incineration of manure. In the EU legislation incineration of manure is classified under the Waste Directive, which demands that incineration gases and ashes should be analysed and processed in an appropriate manner, even in small scale facilities. This is not economically feasible on farm scale incineration plants, which have a poor efficiency ratio.

How much should one pay for the use of manure as fertiliser and to whom is an interesting question. Besides the prices for fertilisers and cereals the answer depends on the distances between farms and parcels. Currently the value of nutrients contained in manure relative to the nutrient content of artificial fertilisers is sufficient to cover quite long transportation distances, and parcels of farms specialised in plant production still seem to be located within the sphere of some typical livestock farms.

If there is not enough manure left over on a livestock farm for all potential recipients, who gets the manure and thus saves on fertilisation costs? When farmers make decisions purely on economic grounds the transaction is usually made between the livestock farm and the plant farm that makes the highest bid. The price offered should not, however, correspond to the full price of artificial fertiliser because spreading with heavy machinery causes soil compaction and the exact nutrient content of animal manure is more uncertain than that of artificial fertiliser.

Without stricter control and more severe sanctions for violating the conditions set for fertilisation, the economic incentive for spreading animal manure on somebody else's farm remains weak. In a functioning market economy very few enterprises would be willing to share free inputs with their competitors on their own initiative. Raising the support payments or stricter fertilisation restrictions alone will not alter the situation.

6. RURAL AND REGIONAL POLICY

6.1. Changes in Finnish rural areas

Finnish countryside has gone through various significant changes in the past few decades. Changes in the regional distribution of labour have led to increased specialisation both between the Finnish regions and within the rural areas. The role of the other rural industries as employers has become increasingly important because of the constant decrease in the number of farms and jobs in primary production as a result of the structural change in agriculture. The strongest phase of this change was over by the end of the 1970s. The accession to the EU in 1995 reinforced the regional concentration of agriculture. This is a common phenomenon throughout the developing world.

Rather than the structural change in the livelihoods, in recent decades the rural areas have been affected the most strongly by our ways of using space. For the Finns the countryside is first and foremost a place for living and recreation. As the number of jobs in primary production has decreased, the jobs have moved to towns and population centres. In terms of permanent places of residence, however, the trend has been slower. To a growing extent the countryside is the location for secondary, third or holiday homes, or a place visited for leisure activities or work. The Finns are still active users of the countryside, but in a different way than before.

The majority of the working-age population in the countryside earn their living from services, just like the urban residents. The proportional share of jobs in the industrial sector is slightly higher in the rural than in the urban areas. Most of the rural working-age population commute to other areas for work. In international comparison our way of using space is quite exceptional, which is reflected in the record high number of summer cottages and holiday homes in Finland: there is one holiday home per 10 inhabitants. Another aspect of this exceptional use of space is that the primary place of residence may be in the countryside and the secondary or third home in a town or city.

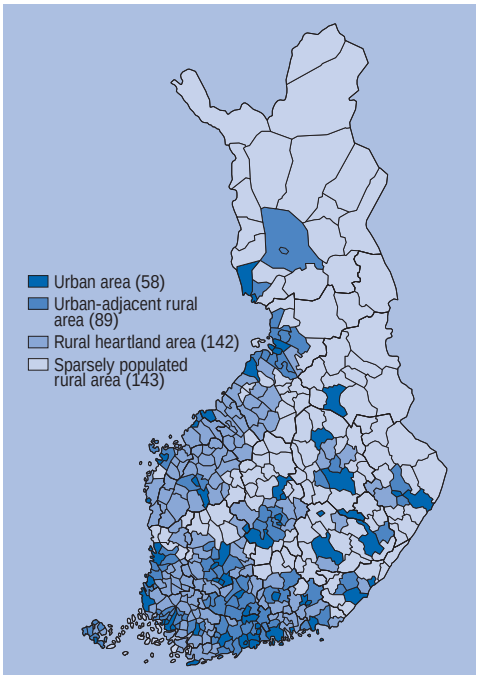
The countryside is a particularly attractive place of residence especially in areas that are adjacent to urban areas, where the well-being of the Finns is the highest. In such areas the share of working-age population and the income and health status of the population are above the average, i.e. higher than in urban areas or other types of rural areas (rural heartland areas and sparsely populated rural areas). These distinctions are important to allow an accurate analysis of the large rural areas in Finland and proper understanding and anticipation of the various development paths.

In the Finnish rural policy it is very typical to view the countryside in terms of three types of rural areas. The typology of municipalities is based on a multi-stage method where the factors influencing the classification include variables indicating the rural nature of the municipality, areas where people go to work and variables indicating the regional structure, structure of economic activities, farming operations and development problems. The analysis made for the typology of the rural areas is considered to reflect the socioeconomic situation and development of the areas so well that the typology is also used for the targeting of various development measures, especially under regional and rural policies, and differentiation of the possible support payments.

Compared to other regions of Europe, the share of the rural population is very high and population density is extremely low in Finland. This is why rural development policy and actions are highly significant for the whole nation. According to the

typology of municipalities from 2006, the 432 Finnish municipalities in 2005 were distributed as follows: 58 urban municipalities, 89 urban-adjacent municipalities, 142 rural heartland municipalities and 143 sparsely populated rural municipalities. In 2005 more than 1.3 million Finns lived in municipalities located in the rural heartland areas and sparsely populated rural areas.

Most of the sparsely populated rural municipalities are in eastern and northern Finland, as well as in certain parts of central Finland and on the south-west coast, where there are numerous small archipelago municipalities. Rural heartland municipalities are typical for the southern and western Finland, while most of the urban-adjacent municipalities are in southern Finland. When the mergers of municipalities are not taken into account, from the typology of rural areas in 1993 the number of rural heartland municipalities has decreased considerably while the numbers of urban-adjacent and sparsely populated rural municipalities have grown. This also tells about the growing differentiation in the development that is taking place in the rural areas.



Typology of Finnish rural areas in 2006. Source: Kajaani Research and Development Centre of the University of Oulu and Finnish Area Research FAR.

In general we can say that, on the basis of the socioeconomic situation and development, the challenges for regional development, measured by all indicators, are in practice greater in sparsely populated rural areas than in the rest of the country. Relative to the national average, the development challenges of rural heartland municipalities are also considerable. Instead, in the light of socioeconomic factors the situation and development of urban-adjacent rural areas are far more positive. This is why perceiving the countryside as a single uniform area for rural development purposes gives a very misleading picture.

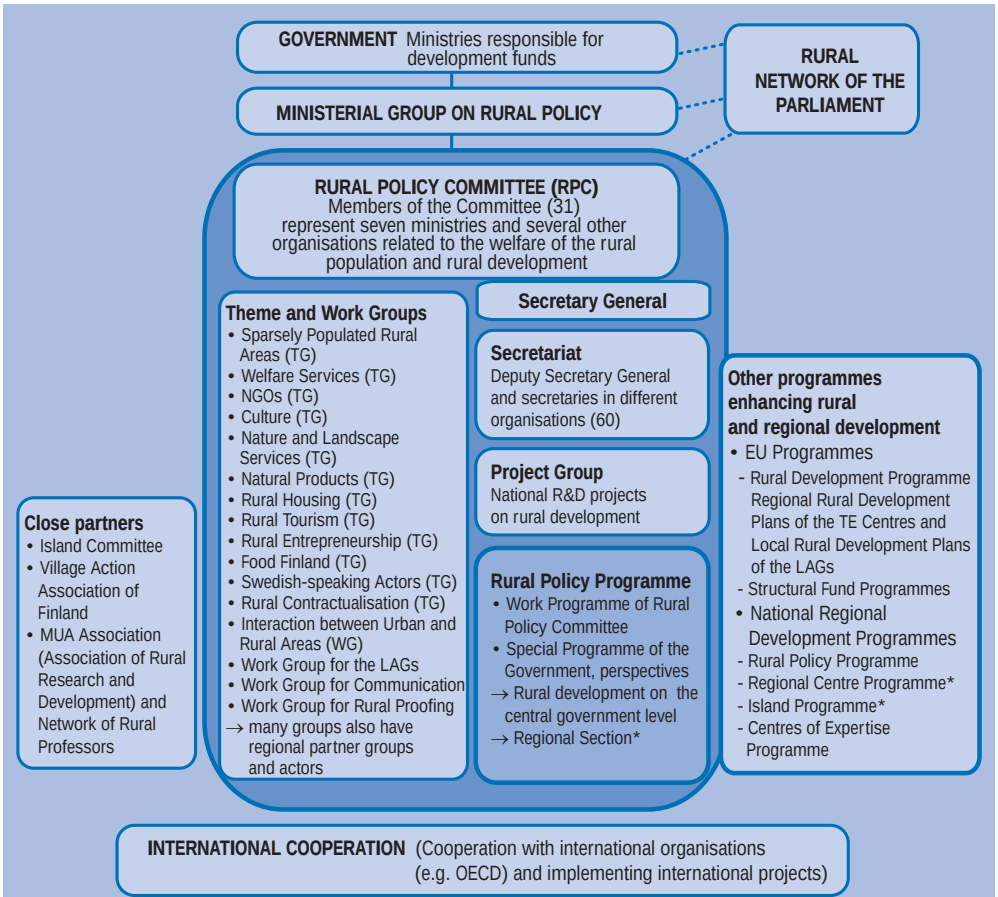
6.2. Finnish rural policy

The core objective of regional policy is to ensure a balanced regional development. Rural policy, in turn, aims to improve the conditions for living and well-being in the countryside, in particular. National rural policy started to take shape during the 1980s in a situation where the positive impacts of sectoral policies on the countryside were diminishing and there was an obvious threat that the rural perspective was becoming overshadowed by other issues. Resources and ready measures available for rural policy were, however, lacking. As a new policy sector it evolved and adapted to the current circumstances and since then the actors, instruments and priorities of the regional and rural policy have assumed the specific shapes of their own, different from each other. In rural policy the role of the third sector and local action receive more emphasis than in regional policy, priority is given to structures that ensure the commitment of different actors and reinforce this, and the leverage provided by the financial resources used is very strong. In international comparison Finnish rural policy is

exceptionally advanced in terms of both structures and policy instruments.

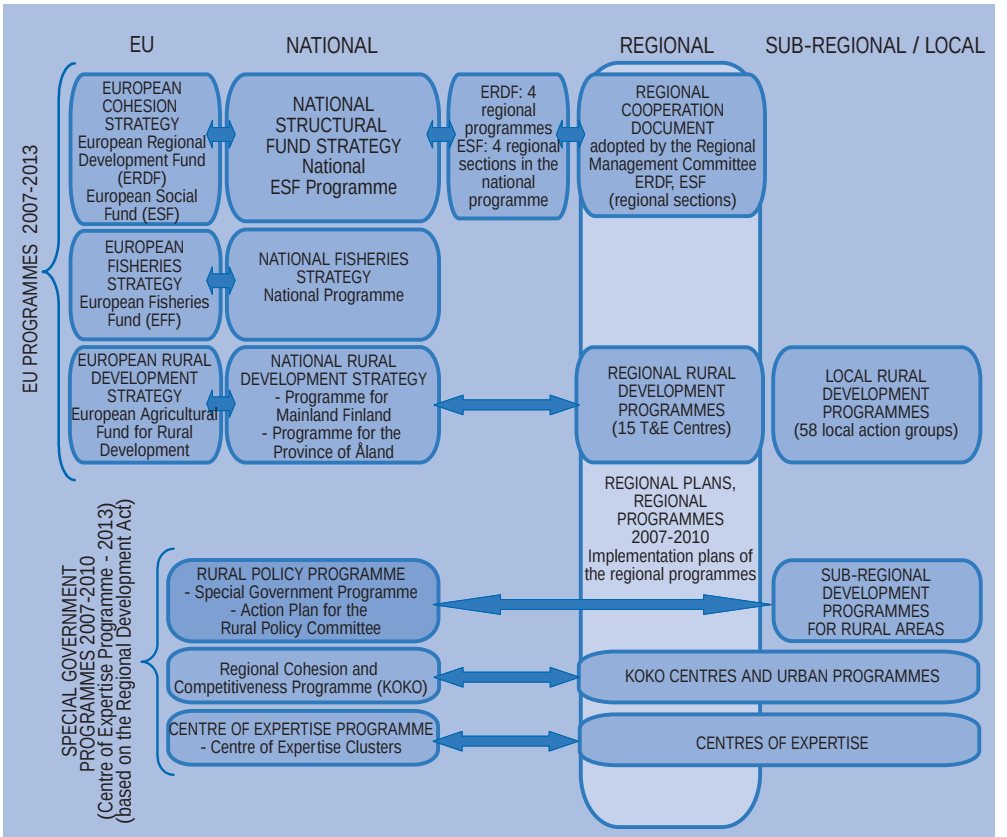
The Finnish countryside and regions are developed under various regional development programmes implemented on different administrative levels by means of co-funding from the EU or national funding. National rural policy has evolved with the special aim of highlighting the rural perspective in all choices and decisions in the society which have either direct or indirect impacts on the countryside. A few years ago the so-called rural proofing (rural impact assessment) was developed as a new tool to be employed in the preparation of and decisions on all issues in the public sector which may have impacts on the countryside. Rural proofing was introduced on the basis of the recommendations included in the OECD Rural Policy Review on Finland.

In the EU context the development of the rural areas and regions is founded on various kinds of policy programmes, usually drawn up to cover a whole programming period. The current period is 2007–2013. As regards rural development the most important programme is the Rural Development Programme for Mainland Finland, where the EU contribution to the funding comes from the European Development Fund for Rural Develop-



* From the beginning of 2010 the Regional Section of the Special Rural Policy Programme, Regional Centre Programme, including the urban programmes in the Uusimaa Region, and local and regional implementation of the Island Programme will be merged into a Cohesion and Competitiveness Programme for the period 2010–2013.

Finnish rural policy network. Source: Ministry of Agriculture and Forestry.



Rural and regional policy framework for the programming period 2007–2013. Source: Ministry of Agriculture and Forestry.

ment (EAFRD). The action programmes under structural funds (especially European Regional Development Fund ERDF and European Social Fund ESF) include objectives which also concern the rural areas. In rural and regional policy efforts are made to reconcile the action programmes based on EU policies and the national special programmes approved by the Finnish Government in such a way that the special local characteristics and needs are taken into account as well as possible. In Finland the rural and regional policy development is steered, in particular, by the Rural Development Strategy, Structural Fund Strategy and Rural Policy Programme. The priorities of the Rural Development Strategy are economically and ecologically sustainable and ethically acceptable agriculture and forestry, developing rural enterprise and reinforcing local initiative. The aim of the Structural Fund Strategy is to reinforce the national and regional competitiveness, employment and well-being. The Rural Policy Programme highlights the impacts of decisions made in various sectors of the society on rural areas and reinforces cross-sectoral rural development.

6.3. Rural Policy Programme and its role in Finnish rural policy

The most important strategic instrument for rural development in Finland is the Rural Policy Programme. The first programme was drawn up in 1991. The fifth Rural Policy Programme for 2009–2013

is entitled Countryside for Vigorous Finland. First and foremost it is the action programme of the Rural Policy Committee, which is responsible for its preparation.

The Rural Policy Programme compiles and steers the rural development actions of both the public and private sector and the NGOs. It comprises a broad spectrum of strategies and actions which apart from the different administrative sectors and the public sector in general also touch upon various other partners. The objective of the Rural Policy Programme is to ensure that the countryside stays a good place to work and live in, and that the resources and opportunities of the countryside support the well-being and competitiveness of the whole country even better than before.

The Rural Policy Programme contains a comprehensive description of the state and development challenges of the Finnish countryside. The current programme consists of 15 strategic outlines divided by themes, with more than 140 proposals for measures. The strategic outlines are in line with those of the Government Report on Rural Policy.

The Rural Policy Committee, which prepares the Rural Policy Programme, is a cooperative body appointed by the Finnish

Strategic outlines of the Rural Policy Programme 2009–2013

Countryside as an operating and residential environment

1. **Sparsely populated rural areas:** Preconditions for living are improved.
2. **Countryside as residential environment:** Countryside is developed as a diversified area of residence where everyday life runs smoothly.
3. **Rural services:** Flexible ways of service provision are developed, taking account of the special conditions in the countryside.
4. **Accessibility and telecommunications:** Accessibility of the countryside and functioning and equal telecommunications are ensured.
5. **Rural nature and environment:** Countryside is developed in an ecologically sustainable manner, taking account of the nature and environment.

Rural employment and livelihoods

6. **Human capital and innovation systems:** Know-how in the countryside is utilised and enhanced and innovation systems are developed.
7. **Development of working life:** Labour policy is developed to respond to the shortage of labour and special needs of the countryside. Work-related immigration is promoted.
8. **Livelihoods and enterprise:** Diversification and development of rural livelihoods and enterprises continues.
9. **Farms and ensuring food supply:** Farms are developed as specialising or expanding units, or as units engaged in diversified business and other operations. Emergency supply of food is ensured through agricultural and industrial policy measures.
10. **Forests and wood:** Forests and wood are utilised more than before as sources of employment and livelihood.
11. **Energy production and ensuring energy supply:** Distributed energy production founded on local and renewable energy sources is utilised in the rural areas, thus contributing to ensuring the energy supply in the whole country.

Developing the rural policy system

12. **Finnish rural policy system and its development:** Development of the national rural policy system continues and the governance dimension of rural policy is reinforced at all levels and administrative sectors which have impacts on the countryside.
13. **Civic action and NGOs:** The preconditions for civic action and role of NGOs in the society are reinforced at all levels.
14. **Local development:** Tools for local development are significantly reinforced.

Rural policy in the international context

15. **European rural policy:** Finland is active in constructing the European rural policy.

Government, comprised of representatives of seven ministries and almost 20 other organisations. At the moment the Committee is chaired by the Permanent Secretary of the Ministry of Agriculture and Forestry. The operative leadership is also placed at the same ministry, but in practice the Committee operates in sectors governed by nine ministries. The task of the Committee is to coordinate rural development actions and promote the efficient utilisation of resources directed to the rural areas. Cooperative arrangements are applied to support national, regional and local rural development work and promote the opportunities to take advantage of the EU co-funded programmes and other rural development tools. The term of the present Committee is from 17 July 2008 until 16 July 2013. It continues the work of the previous Rural Policy Committees, which were appointed by the Ministry of the Interior and the Ministry of Agriculture and Forestry.

The preparation of the Rural Policy Programme coincided with the drafting of the *Government Report on Rural Policy for the Finnish Parliament*. These reports are issued less frequently than the Rural Policy Programme and they do not have the same regularity as the programmes. Both documents share the same strategic outlines, but the programme is more concrete as well as more comprehensive than the Government report. The concrete aspects of the programme include the shorter time span (for the report 2009–2020) and a large number of proposals for measures. Whilst the report is mainly concerned with the central government actors, the programme is also concerned with other levels of public administration as well as with the private and third sector. The *Special Rural Policy Programme* is a special programme of the Government which defines the Government's rural policy outlines and decisions on development measures for a period of four years (the current period is 2007–2010).Through the Special Rural Policy Programme the Government aims to respond to the main rural development policy challenges in the near future. A responsible ministry or State authority has been assigned for each measure.

The roles of the Rural Policy Programme and Rural Policy Committee in the field of Finnish rural policy are best understood through the concepts of narrow and broad rural policy. *Broad rural policy* comprises the political outlines, decisions and allocation of resources by different administrative sectors which may have any kinds of impacts on the preconditions for rural development. *Narrow rural policy*, in turn, refers to actions whose specific and defined purpose is to promote rural development, such as the Rural Develop-

Comparison between the old and new rural policy paradigm.

	Old paradigm	New paradigm
Objectives	Harmonisation, farm income, competitiveness of farms	Competitiveness of rural areas, enhancing local resources, utilisation of unused resources
Key sector	Agriculture	Several rural livelihoods (tourism, handicraft, processing and manufacturing industry, IT, etc.)
Main instruments	Support	Investments
Key actors	National governments, producers and producer organisations	All administrative levels (transnational, national, regional and local), all local actors and experts (public, private, NGOs)

Source: Uusitalo 2009: 201

ment Programme for Mainland Finland under the EAFRD and sections concerning the rural areas under the Structural Fund Programmes. The Rural Policy Programme brings together actors involved in the broad and narrow rural policy and provides a comprehensive picture of the rural development needs and the available measures.

The Rural Policy Programme represents the so-called new rural policy paradigm. According to this, a core principle of the rural policy is that it is area-based: the policy is targeted at the countryside and the whole broad spectrum of different actors. The aim is to improve the viability and functioning of the rural areas starting from their own needs, resources and perspectives. The new paradigm is characterised by administration on several levels, where the top-down steering by the central Government has been replaced by interaction among different administrative levels, NGOs and the private sector. The main difference compared to the "old" rural policy thinking is that the countryside is no longer defined through agriculture. There are large rural areas in Finland with no significant agricultural activities. Agriculture has a role of its own to play in the rural policy paradigm, but this may vary considerably between different kinds of rural areas.

6.4. Socioeconomic role of agriculture in rural areas

Finnish rural thinking was for a long time dominated by agriculture. The reasons for this largely derive from the history. Compared to Central, Southern and Western Europe, the central role of agriculture in preserving the basic population in the rural areas and as the most significant economic activity continued much longer in Finland. In part this was due to political choices, in part the natural geography and demographic aspects. The settlement of immigrants and veterans to small farms after the Second World War increased the number of people who earned at least part of their living from agriculture at the very same time when elsewhere the trend was the exact opposite. In addition, the sparse population, long distances and lack of (urban) centres at least indirectly related to these slowed down the appearance of new sources of livelihoods alongside agriculture.

Finland is still a very rural country, where agriculture signifies a number of various things, depending on the type of rural area. In 2005, 41% of the Finnish population lived in rural areas as defined by the typology of municipalities. The type of rural areas the Finns now mostly live in is changing gradually. This is also reflected in the policy challenges to which rural development should be capable of responding.

Southern and western Finland, where most of the urban-adjacent rural areas are located, possess the most favourable and diverse natural preconditions for practising agriculture. The local markets function better than in the other types of rural areas, and thanks to the shorter distances it is also easier to work outside the farm. Agricultural production is on the decrease in urban-adjacent rural areas, where the farms are introducing high value added services activities which are not directly linked to agricultural production, such as horse husbandry or farm tourism. Rural heartland areas, in turn, are strong agricultural production areas or rural areas with diverse activities. The majority of the rural heartland municipalities are also located in southern and western Finland. In rural heartland areas larger centres are a little further away, but there are medium-sized centres at a reasonable distance. The situation is quite good as regards the demand for products and services and off-farm employment. In the sparsely populated rural areas, mainly in eastern and northern Finland, the natural conditions restrict the practising and opportunities of agriculture the most. More than in the other parts of the country,

Share of agriculture as in the labour force and share of farming as in the total income of farms.

	Urban-adjacent rural areas*	Rural heartland areas	Sparsely populated rural areas	Whole country
Share of agriculture in jobs in 2005 (1988)	4.6% (10.7%)	12.6% (22.9%)	11.3% (21.4%)	3.3% (7.5%)
Share of farm income** in total income of farms in 2004 (1997)	32.8% (42.9%)	42.1% (48.7%)	48.3% (54.0%)	40.9% (48.2%)

** according to the division of rural areas into three types of 2000 and typology of municipalities of 1 January 2008.*
*** Farm income includes the income from agriculture and farm forestry. Source: Statistics Finland.*

long distances are a major obstacle to both off-farm employment and local marketing of products and services.

According to the employment statistics of Statistics Finland, in the rural areas as defined in the typology of municipalities the share of jobs in agriculture was 9% in 2005, while in 1988 it was still 19%. The role of agriculture as an employer varies considerably between the different types of rural areas so that in urban-adjacent rural areas the proportional share of agriculture of the jobs is much smaller than in the other types of rural areas. In addition, in all types or rural areas and the whole country the share of agriculture in the labour force is decreasing constantly. In 2005 the share of agriculture in the total number of jobs in Finland was a little over 3%, while in 1988 it was 7.5%.

The significance of farming has diminished in terms of both total employment in the sector and its share of the total income of farm households. In 2004 the average share of farm income in the total income of farms was 41%, while in 1997 it was 48%. The share of farm income of the total income of farms is the greatest in sparsely populated rural areas (48% in 2004) and smallest in urban-adjacent rural areas (33%). In rural heartland areas this share was 42% in 2004. It should be noted that in the agricultural income and tax statistics farm income also includes farm forestry and other entrepreneurial activities connected to farming practised by diversified farms under the Agricultural Income Act. Of the other entrepreneurial activities of diversified farms about two-thirds take place under the Agricultural Income Act and one-third under the Act on the Taxation of Trade Income, i.e. the latter is not shown as agricultural income. This means that part of the earnings included in agricultural income in fact derives from other entrepreneurial activities. More than a third of the Finnish farms are so-called diversified farms, i.e. engage in other entrepreneurial activities besides agriculture

Active farms in Finland in 2005 (1 dot = 1 farm).

and farm forestry.

The concentration of farms to fewer and fewer areas continues. In recent decades the number of farms has decreased the most in sparsely populated rural areas, i.e. especially in eastern and northern Finland. On the other hand, it is also in eastern and northern Finland where the sparsely populated rural areas faced with the greatest development challenges have increased the most. In 2005, 52% of the farms were in rural heartland municipalities, 22% in sparsely populated rural municipalities, 17% in urban-adjacent rural municipalities and 9% in urban municipalities. Eastern and northern Finland are particularly strongly affected by the structural change in agriculture. In these areas agriculture is still a significant employer, which is why the consequences of structural change – substituting machines and more advanced technologies for labour – are felt the most strongly.

6.5. Resources of the countryside

Finnish rural areas are becoming more and more differentiated in terms of their socioeconomic profiles, while agricultural production is concentrating to fewer farms and smaller areas. As a whole the proportional significance of agriculture has diminished clearly and in some places it has even become marginalised relative to the other economic activities. In spite of this predominant trend, in certain areas agriculture is still highly important for the local and regional economy. Depending on the area, agriculture and farms may also have quite different roles as regards, for example, the share of agricultural income in the total income of farm households. Even if basic agricultural production is on the decrease, the farms as such may keep their position as locally significant junctions for economic and social activities as they are reorienting their activities.

The basic task of rural and regional policy is to promote a balanced regional development in our country. The sparse population which extends to almost all parts of Finland is a major challenge as such. In view of the changes it is important to observe that the Finnish countryside is by no means being deserted. Rural areas are still perceived as the most attractive places of residence, and areas which have been losing population are not getting empty, either. In eastern and northern Finland we are thus mainly concerned with a thinning population, not complete desertion of the areas. Our way of life has changed in a manner that is difficult to capture through the statistics on permanent residence alone. Parts of the countryside are becoming places for “popping in”, with specific functions of their own.

The new countryside can be perceived more accurately through the use of space. Urban-adjacent rural areas are to a growing extent used for spacious living and service production. The core of agriculture rests in the rural heartland areas, together with other entrepreneurial activities. Various livelihoods are practised in sparsely populated rural areas often in connection with farms, but also with no link to these. The trump cards for the sparsely populated areas include various natural products, space, peace and quiet – even darkness. One important strength in all rural areas are active citizens capable of influencing their own living conditions, functioning democracy, locally mobilised civil society, well-targeted rural policy instruments, and forums for activity. In order to take full advantage of these resources the rural areas must be accessible and basic services must be organised in a way that takes account of the special characteristics of the areas.

When dealing with rural development, perceiving the countryside as a homogenous whole is not feasible. The development tools must be based on the local initiative, in close contact with time and space. In this work Finland is among the tops in the world.

Municipal catering services, school meals and sustainable food supply

Helmi Risku-Norja

Food consumption has significant impacts on the national economy, environment and public health. Sustainable food services promote human and environmental health and social justice as they ensure the preconditions for reasonably good living while taking into account the carrying capacity of the environment. All this is founded on sufficient food production in people's own living environments, which means that the basic food items should be produced close to the consumers.

Municipal catering from the perspective of sustainable food supply was studied on the basis of the results from two enquiries, one directed to those responsible for food services in municipalities and the other to the teachers in basic education. The municipal catering services in Finland are firmly based on domestic products, only as regards to fruit, and to lesser extent also to fish, the share of import is considerable. The caterers are interested in local products, seasonal products and fish being the most commonly used items. Local and domestic food is also valued highly in schools, and there are serious concerns that the children be alienated from wholesome basic domestic food. However, the price of food is a major factor behind the purchase decisions and, as the rules for competitive bidding also apply to foodstuffs, developing food services on the local basis is perceived as difficult. Food procurement is often centralised so that the decisions are made beyond the reach of the catering personnel, which narrows down their possibilities to influence the purchases. Even if the caterers appreciate domestic and local food, and there is willingness to increase its use, the caterers do not necessarily consider domesticity is as an important perspective in future development of municipal food services. Thus, the preferences of the respondents are not always in line with their perceptions about the anticipated future development trends.

Both at schools and in municipalities the perception of sustainability is focused on environmental issues, while economic aspects are considered as obstacles to sustainability rather than integral elements of it. The social, cultural and aesthetic dimensions of sustainable food supply were present to a varying degree in the responses, but they were not necessarily associated with sustainability at all.

Public food services steer consumer habits

In Finland public catering has had, and still has an important role in promoting healthy eating habits and it has, thereby, contributed to reducing the costs of national healthcare. Through similar civic education public catering has all the possibilities to influence eating habits so as to promote sustainability also in other respects. This requires that the various dimensions of sustainability are clearly brought into the context of public catering and local food system. In addition, public catering may exert an influence through the sheer volume. It namely comprises a single large and fairly homogeneous consumer group, the behaviour of which is through the statutory nature much more predictable than that of the individual citizens.

If public catering were committed to the principles of sustainable food provisioning, it could provide a channel for improving sustainability within the food sector. This calls for conscious food education aimed at influencing the values and attitudes of the citizens in order to create a more sustainable food culture. Individual food consump-

tion is an important part of food education, the success of which is shown as changes in personal food choices. However, acting in private sphere is not the means to progress towards sustainability. An important part of food education deals with empowering the people by providing means and channels of citizen activity in order to influence decision-making.

Food education is best implemented in practice by developing the every day eating in schools and working places as a pleasant occasion of social interaction. The positive experiences and story-telling provide favourable substrate for new knowledge and enable highlighting the linkages between food and the society, and its significance to social cohesion. Communication is an essential element of interactive development of food services, because food services are significantly influenced by customer feedback. The citizens need information on the nutritional quality, on price formation and origin of food, on means of food production and its environmental impacts, and on their own possibilities to contribute to developing the food services.

Municipal food services are important in passing on food culture, because tradition, present and future are combined in a very natural way in the daily meals. Shared meals have a social meaning in bringing people together and supporting community cohesion. Meals offered by the public food services are an integral part of everyday life and they can mediate a concrete message of how sustainability can be promoted through also food choices.

Focus on schools

The major customer group of public catering is children and young people. Many of the enduring eating patterns are created in the early age rendering the school meal system as an especially promising means to promote healthy and sustainable eating. Daily school meals are important for building up experiences and they should also be incorporated into the sustainability education. Learning about the various dimensions of sustainability could thereby be combined with personal experiences and practical observations during the lunch break.

Constantly diminishing resources is forcing cut in expenditure in all possible ways especially for municipal services. Instead of directing more resources to food services, cuts are compromising the quantity and/or quality of food. The rationale behind cost savings regarding school meals is that the resources for teaching should not be the first ones to be cut. However, short-term savings may lead to high costs in the long term. Besides promoting healthy eating and being a precondition for learning, school meals are a part of teaching. Through the daily lunch the children have access to the Finnish countryside on an everyday basis – an aspect of food which does not receive enough attention at schools. In addition to this, food has various other linkages that represent the different elements of sustainability, and food actually opens up perspectives to the global social and environmental issues. School lunch is an important resource for teaching which so far has been utilised hardly at all.

In Finland school meals have expanded from the original idea of helping the less fortunate to include all children and pupils in kinder gardens, primary schools and in secondary general and vocational schools. Thanks to the principles of justice and equity, the Finnish school meal model is internationally well-known and highly valued. By integrating food education in sustainability education, it is possible to incorporate school meals into school's educational goals. Finland has an excellent opportunity of becoming a model country of not only school meals but also of food education.

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Producer price index and index of purchase prices of means of agricultural production (2000 = 100).[1]

	Producer price index of agriculture[2]	The index of purchase prices of means agricultural production			
		Total index	Goods and services	Investments	Buildings
2009	107.6[e]	126.9	124.1	135.2	131.5
2008	119.9	139.5	141.8	134.3	136.6
2007	109.3	122.1	119.1	129.0	132.1
2006	103.2	116.1	113.7	121.6	120.5
2005	98.9	110.8	108.2	116.8	114.0
2004	101.5	107.1	105.1	111.8	109.5
2003	99.0	104.2	102.5	108.1	106.3
2002	103.7	102.8	101.5	105.5	104.6
2001	105.2	102.2	101.8	103.1	102.4
2000	100.0	100.0	100.0	100.0	100.0
1999	96.6	95.0	94.2	97.2	96.4
1998	101.3	96.2	96.4	95.1	95.1
1997	102.5	97.5	98.4	94.0	93.7
1996	108.1	95.6	96.4	92.5	89.7
1995	103.6	94.2	94.6	92.3	90.5

[1] Indices are based on EU classifications.
[2] Incl. fur production.
Source: Statistics Finland.

Structural change in agiculture.

	Number[1] of farms 1,000	Average[1] size of farms, hectares	Number of milk suppliers 1,000	Employed in agriculture	
				1,000 persons	% of employed
2009	64	36.0	11	90	3.7
2008	66	35.0	12	90	3.6
2007	67	34.4	13	89	3.6
2006	69	33.3	15	91	3.7
2005	70	33.0	16	93	3.9
2004	72	31.5	17	93	3.9
2003	74	30.6	18	99	4.2
2002	75	30.0	19	106	4.5
2001	77	29.1	21	112	4.7
2000	80	28.0	22	118	5.1
1999	..	..	24	121	5.3
1998	88	25.0	26	120	5.4
1997	90	24.0	28	130	6.0
1996	94	22.9	30	133	6.3
1995	100	21.7	32	141	6.7

[1] A farm refers to a unit with more than 1 ha of arable land that practises agriculture or other entrepreneurial activity.
Sources: Information Centre of the Ministry of Agriculture and Forestry, Statistics Finland.

Number of animals in June and the average yield per cow.

	Dairy cows 1,000	Yield per cow litres	Pigs 1,000	Hens 1,000
2009[1]	290	7,850	1,381	2,926
2008[1]	289	7,767	1,483	3,190
2007[1]	296	7,796	1,448	3,134
2006[1]	309	7,646	1,436	3,103
2005[1]	319	7,505	1,401	3,128
2004[1]	324	7,404	1,365	3,069
2003[1]	334	7,251	1,375	3,016
2002[1]	348	7,117	1,315	3,212
2001[1]	355	6,932	1,261	3,202
2000[1]	364	6,786	1,296	3,110
1999[1]	372	6,443	1,351	3,361
1998[1]	383	6,225	1,401	3,802
1997[1]	391	6,183	1,467	4,152
1996[1]	392	5,993	1,395	4,184
1995[1]	399	5,982	1,400	4,179
1994	417	5,869	1,298	4,090
1993	426	5,648	1,273	4,025
1992	428	5,613	1,298	3,969
1991	446	5,619	1,344	4,138
1990	490	5,547	1,394	4,845

[1]1.5.

Sales of fertilizers, kg/ha and hectarage yield, f.u./ha.

	Nitrogen kg/ha	Phosphorus kg/ha	Potassium kg/ha	F.u.yield (incl. straw) f.u./ha
2008–09	67.1	5.3	16.2	..
2007–08	78.5	7.8	24.3	..
2006–07	73.5	7.9	24.6	..
2005–06	73.9	8.6	25.3	4,673
2004–05	75.0	9.2	25.9	4,826
2003–04	76.5	9.3	26.4	4,630
2002–03	80.0	9.8	27.8	4,478
2001–02	80.5	10.1	28.3	4,692
2000–01	83.2	10.8	31.1	4,531
1999–00	84.2	10.4	30.5	4,900
1998–99	81.0	11.0	31.1	3,146
1997–98	85.0	11.4	32.6	2,980
1996–97	86.0	11.8	32.5	3,816
1995–96	92.3	16.1	34.3	3,736
1994–95	101.6	20.0	38.5	3,655

Source: Information Centre of the Ministry of Agriculture and Forestry.

Total calculation of agriculture (excl. horticulture) at current prices, million euros.

	2003	2004	2005	2006	2007	2008	2009e
CROP PRODUCTION							
Rye	6.1	5.1	3.4	3.2	10.7	9.9	4.3
Wheat	55.2	54.6	53.3	50.9	88.6	88.2	74.8
Barley	69.3	67.1	64.3	73.9	141.2	130.8	93.7
Oats	45.5	36.9	33.5	31.9	66.5	72.2	39.4
Potatoes	38.5	51.2	47.0	33.1	59.8	43.7	51.9
Potatoes for processing	18.2	19.2	19.6	17.2	19.1	21.3	20.1
Sugar beet	56.8	60.9	51.4	42.8	22.8	19.1	19.0
Oil plants	19.8	13.2	18.7	26.7	33.5	29.5	23.7
Other crop production	10.5	10.8	8.1	9.1	11.0	9.5	10.0
Total	**319.9**	**319.0**	**299.3**	**288.7**	**453.3**	**424.1**	**336.8**
ANIMAL PRODUCTION							
Milk	871.1	844.0	814.2	811.7	869.8	981.5	897.2
Beef (excl. veal)	185.5	185.0	177.7	184.6	195.3	197.4	204.6
Pork	229.7	246.1	261.6	262.0	280.6	312.9	290.9
Mutton	1.1	1.3	1.3	1.4	1.6	1.6	1.8
Poultry meat	110.2	111.1	104.5	100.9	112.0	134.2	120.5
Eggs	42.4	41.8	34.9	35.4	43.7	55.2	48.3
Other animal production	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Total	**1,440.2**	**1,429.6**	**1,394.4**	**1,396.1**	**1,503.2**	**1,683.0**	**1,563.5**
Gross return at market prices	**1,760.1**	**1,748.6**	**1,693.7**	**1,684.9**	**1,956.5**	**2,107.2**	**1,900.3**
COMPENSATIONS FOR CROP DAMAGES	**2.7**	**2.7**	**19.6**	**1.0**	**5.2**	**1.6**	**5.4**
INCOME FROM RENTS							
Means of production	36.4	36.5	36.8	37.4	38.4	20.0	20.0
Buildings and land	29.6	29.7	30.2	31.7	31.8	76.4	79.5
Total	**66.0**	**66.2**	**67.0**	**69.1**	**70.2**	**96.4**	**99.5**
Other returns and compensations (energy tax refund)							
SUPPORT PAYMENTS							
Single farm payment scheme				489.6	485.5	488.2	493.8
CAP subsidy for fields crops	353.2	366.4	381.5	5.8	5.5	5.0	5.2
CAP subsidy for livestock	93.8	88.1	142.3	51.1	32.6	32.6	32.0
Other CAP payments				29.7	15.8	33.2	19.0
LFA	419.4	420.2	418.3	417.1	417.3	417.9	416.7
Environmental subsidies	283.8	290.3	284.1	289.9	303.2	317.7	337.7
Subsidy for animal units (nordic subsidy)	105.3	114.1	99.7	99.3	101.0	101.0	104.4
Other national subsidies for animals	80.0	78.9	65.1	59.5	56.8	50.6	50.1
Other national subsidies for field areas	147.4	148.1	221.7	230.3	225.7	190.3	185.7
Production subsidies							
- milk	211.5	228.0	185.5	162.9	166.8	170.1	173.5
Subsidy paid by the common measures of the EU	1,150.1	1,165.0	1,226.2	1,283.2	1,259.8	1,294.6	1,304.4
National subsidies	544.2	569.1	572.0	551.9	550.3	512.0	513.7
Total subsidies	**1,691.6**	**1,734.1**	**1,798.2**	**1,835.1**	**1,810.1**	**1,806.6**	**1,818.1**
GROSS RETURN TOTAL	**3,520.5**	**3,551.6**	**3,578.4**	**3,590.1**	**3,842.0**	**4,041.5**	**3,835.3**

Total calculation of agriculture (excl. horticulture) at current prices, million euros.

	2003	2004	2005	2006	2007	2008	2009e
COSTS							
Fertilizers	176.9	166.5	169.9	175.2	176.6	291.9	169.0
Lime	22.8	20.0	21.2	26.9	20.2	25.8	29.9
Feed concentrates	346.0	350.5	341.0	335.8	376.1	430.4	362.6
Feed conserving chemicals	20.8	21.6	22.2	23.2	24.1	25.4	25.6
Plant protection products	59.2	60.2	64.1	61.0	60.1	73.5	86.1
Purchased seeds	46.9	57.5	60.4	57.4	56.7	68.9	59.8
Fuel and lubricants	135.6	157.5	199.6	219.8	228.9	309.0	224.4
Electricity	79.0	80.0	78.9	83.9	89.7	107.1	114.3
Overhead costs	286.3	294.1	304.5	318.1	329.5	344.0	347.4
Hired labor costs							
- wages	90.0	92.1	97.6	100.0	105.0	104.4	108.9
- social expenses	60.8	63.2	66.8	68.6	71.9	69.9	74.7
Machinery and equipment expenses							
- depreciations	366.1	381.3	402.2	417.4	432.6	461.9	479.8
- maintenance	149.8	155.0	160.0	168.5	174.2	182.2	189.8
Equipment	43.9	45.8	48.3	50.1	52.0	55.5	57.6
Building expenses							
- depreciations	235.9	243.1	251.0	264.4	289.9	299.8	288.8
- maintenance	42.6	43.5	44.9	46.6	50.0	51.0	51.0
Ditches, bridges, etc.							
- depreciations	68.1	70.2	73.1	77.0	84.5	87.3	84.2
- maintenance	21.6	22.1	23.0	23.9	25.6	26.1	26.1
Interest payment	126.8	128.4	122.1	122.7	140.0	136.6	123.5
Rent expenses							
- means of production	41.5	41.5	42.2	43.0	44.0	22.9	22.0
- buildings and land	81.9	82.1	84.2	88.3	88.7	147.2	153.2
Farmers' share of cost from							
- accident insurance payment	11.8	11.7	11.6	11.8	12.1	10.2	10.6
- outside help	15.2	15.6	16.2	16.0	16.4	15.7	16.4
- day-off scheme	4.4	5.2	5.5	6.5	5.7	6.6	7.5
TOTAL COSTS	**2,533.9**	**2,608.8**	**2,710.8**	**2,806.2**	**2,954.4**	**3,353.2**	**3,113.1**
FARM INCOME EXCL. HORTICULTURE	**986.6**	**942.8**	**867.6**	**783.9**	**887.7**	**688.3**	**722.1**

Gross return of horticulture at current prices, million euros.

	2003	2004	2005	2006	2007	2008	2009e
FIELD PRODUCTION							
Vegetables	83.3	80.0	76.2	82.1	99.7	96.6	95.3
Berries and fruits	39.2	37.2	35.6	37.0	46.7	55.4	52.4
Others	20.2	21.2	21.2	21.2	22.3	22.3	23.1
Total	**142.7**	**138.4**	**133.0**	**140.3**	**168.6**	**174.3**	**170.9**
GREENHOUSE PRODUCTION							
Ornamental plants	99.6	104.8	96.6	93.8	98.7	99.0	98.1
Vegetables	115.2	119.0	124.3	140.8	135.9	147.7	140.0
Total	**214.8**	**223.8**	**220.8**	**234.6**	**234.6**	**246.7**	**238.1**
Gross return at market prices	**357.5**	**362.2**	**353.8**	**375.0**	**403.2**	**421.0**	**409.0**
SUBSIDIES							
Subsidies for greenhouses	40.3	40.1	40.1	39.1	38.2	37.3	36.5
Subsidies for field production	1.9	2.0	2.0	2.0	1.9	1.8	2.0
Other subsidies	11.4	11.8	11.9	14.6	19.1	18.9	19.5
Total	**53.6**	**53.9**	**54.0**	**55.8**	**59.2**	**58.1**	**58.0**
GROSS RETURN TOTAL	**411.1**	**416.1**	**407.8**	**430.7**	**462.4**	**479.0**	**467.0**
COSTS							
Fertilizers and lime	7.6	7.8	8.2	8.5	8.9	15.4	11.5
Plant protection products	5.6	5.6	5.5	5.3	5.2	5.6	6.3
Seeds, seedings, plants	13.6	13.4	13.9	13.6	14.5	17.0	16.2
Other material	34.8	35.7	36.7	38.6	40.4	48.1	48.6
Hired labor costs	65.2	74.7	75.9	79.7	80.2	79.9	79.9
Fuel and lubricants	15.7	17.8	23.4	24.1	23.8	31.0	22.5
Electricity	21.5	21.8	21.5	23.2	24.2	27.0	28.5
Interests paid	15.2	14.5	13.5	13.5	14.1	14.1	13.6
Depreciation of machinery	22.3	23.3	24.7	25.4	26.4	28.2	29.5
Depreciation of buildings	21.0	21.7	22.5	23.8	26.1	27.0	25.9
Depreciation of ditches, etc.	1.7	1.8	1.9	1.9	2.1	2.2	2.3
Other costs	52.7	50.5	52.1	53.7	55.9	58.2	59.3
TOTAL COSTS	**276.9**	**288.6**	**299.8**	**311.3**	**321.7**	**353.8**	**344.3**
HORTICULTURAL INCOME	**134.2**	**127.6**	**108.0**	**119.4**	**140.7**	**125.2**	**122.7**

Total calculation of agriculture (incl. horticulture) at current prices, million euros.

	2003	2004	2005	2006	2007	2008	2009e
RETURN ON AGRICULTURE	3,520.5	3,551.6	3,578.4	3,590.1	3,842.0	4,041.5	3,835.3
RETURN ON HORTICULTURE	411.1	416.1	407.8	430.7	462.4	479.0	467.0
RETURN, TOTAL	**3,931.6**	**3,967.7**	**3,986.3**	**4,020.8**	**4,304.4**	**4,520.6**	**4,302.3**
COSTS OF AGRICULTURE	2,533.9	2,608.8	2,710.8	2,806.2	2,954.4	3,353.2	3,113.1
COSTS OF HORTICULTURE	276.9	288.6	299.8	311.3	321.7	353.8	344.3
COSTS, TOTAL	**2,810.8**	**2,897.3**	**3,010.6**	**3,117.5**	**3,276.1**	**3,707.0**	**3,457.5**
AGRICULTURAL INCOME	**1,120.7**	**1,070.4**	**975.6**	**903.3**	**1,028.4**	**813.6**	**844.8**

Agricultural support[1].

SUPPORT FINANCED COMPLETELY OR PARTLY BY THE EU IN 2010, €/ha or €/unit							
Aid area	A	B	C1	C2	C2north	C3	C4
DECOUPLED CAP PAYMENTS, €/ha							
Single payment (regional flat-rate payment), €/ha,	246.6	195.8	195.8	152.7	152.7	152.7	152.7
Farm-specific top-ups:							
Farm specific top up for bulls, €/livestock unit	63	63	63	63	63	63	63
Farm specific top up for steers, €/livestock unit	45	45	45	45	45	45	45
Farm specific top up for starch potato, €/tonne	17.69	17.69	17.69	17.69	17.69	17.69	17.69
Additional payment for milk, €/tonne of the reference quantity	24.49	24.49	24.49	24.49	24.49	24.49	24.49
Farm specific top up for sugar beet, €/tonne	87	87	87	87	87	87	87
PRODUCTION PREMIUM FOR ARABLE CROPS[2]	50	50	50	50	50	50	50
CAP LIVESTOCK PREMIUMS, €/animal							
Special premium for bulls and steers	252	252	150	150	150	150	150
Suckler cow premium	190	190	100	100	100	100	100
Dairy cow premium	140	140	-	-	-	-	-
Ewe premium[3]	10.5	10.5	10.5	10.5	10.5	10.5	10.5
LFA SUPPORT,€/ha[4]							
LFA support	150	200	200	210	210	210	210
LFA supplement[5]							
- basic payment	20	20	20	25	25	25	25
- additional payment for livestock farms	80	80	80	80	80	80	80

ANIMAL WELFARE PAYMENT, €/LU	Basic conditions	Additional conditions
Bovines	17.50	3.58–21.29
Pigs	5.00	1.53–13.29

ENVIRONMENTAL SUPPORT, €/ha	Crop producing farm	Livestock farm
Cereal, oilseed crops, protein crops, grasses	93	107
Group 1 horticultural crops (outdoor vegetables etc.)	450	450
Group 2 horticultural crops (berries and fruits)	438	438
Nature management fields (perennial grasses)	170	170
Nature management fields (biodiversity)	300	300
Certain seed spice plants	181	181

Additional agri-environment measures: support areas A, B and C: reduced fertilisation 10 €/ha, more accurate nitrogen fertilisation of arable crops 23 €/ha, manure spreading during growing season 27 €/ha, plant cover in winter and reduced tillage 11 €/ha, nutrient balances 18 €/ha.
Additional measures only for areas A and B: plant cover in winter 30 €/ha, intensified plant cover in winter 45 €/ha, crop diversification 24 €/ha, extensive grassland production 55 €/ha and cultivation of catch plants 13 €/ha.
Additional measures for horticulture (support areas A, B and C): more accurate nitrogen fertilisation of horticultural crops 90 €/ha, use of cover for perennial horticultural crops 256 €/ha and use of pest monitoring methods 144 €/ha.
Contracts concerning special agri-environment measures: support level 56–450 €/unit of payment.

[1] Includes payments for main products, which means that the table does not cover all support payments.
[2] Maximum support level. Eligible crops are winter rye, winter wheat, triticale, spelt wheat sown in the autumn, winter oilseed rape, winter turnip rape, spring oilseed rape, spring turnip rape, sunflower, soybean, field bean, sweet lupin, oilseed flax, fibre flax, fibre hemp, field pea (food and feed pea) and mixed plantations of cereal and protein crops.
[3] Milk production animals 8.4 €/animal. In addition, supplement to less-favoured farming areas 3.5 €/ewe.
[4] In LFA scheme livestock farm is a farm with minimum stocking density of 0.4 LU/ha or the farm has at least 10 LU and the minimum stocking density is 0.2 LU/ha for the whole commitment period.
[5] Top-ups to LFA payments are cut due to payment ceilings. In 2009 the payments were 98.3% of the maximum per hectare.

	Unit	2005 €/unit	2006 €/unit	2007 €/unit	2008 €/unit	2009 €/unit	2010 €/unit
NATIONAL SUPPORT FOR AGRICULTURE AND HORTICULTURE NATIONAL AID FOR SOUTHERN FINLAND, NORTHERN AID AND AID FOR CROP PRODUCTION							
Aid per livestock unit							
Aid for animal husbandry, suckler cows							
A and B	€/LU	86	80	77	73	83	83
C1	€/LU	299	296	295	295	300	300
C2	€/LU	299	296	295	295	300	300
C2north. and archipelago	€/LU	375	372	371	371	376	376
C3	€/LU	450	447	446	446	451	451
C4	€/LU	635	632	631	631	636	636
Aid for animal husbandry, male bovines >6 months							
A and B	€/LU	219	208	199	187	187	187
C1	€/LU	415	417	414	414	414	414
C2	€/LU	423	425	422	422	422	422
C2north. and archipelago	€/LU	499	501	498	498	498	498
C3	€/LU	575	577	574	574	574	574
C4	€/LU	760	762	759	759	759	759
Aid for animal husbandry, ewes and goats							
A and B	€/LU	212	197	194	184	184	184
C1	€/LU	404	399	390	390	390	390
C2	€/LU	412	407	398	398	398	398
C2north. and archipelago	€/LU	488	483	474	474	474	474
C3P1–P2	€/LU	816	758	664	664	664	664
C3P3–P4	€/LU	917	839	745	745	745	745
C4P4	€/LU	1,102	1,049	956	956	956	956
C4P5	€/LU	1,102	1,049	956	956	956	956
Aid for animal husbandry, pigs							
A and B	€/LU	215	206	199	174	*)	*)
C1	€/LU	226	220	210	210	**)	**)
C2	€/LU	226	221	213	213	**)	**)
C2north. and archipelago	€/LU	307	302	293	293	**)	**)
C3	€/LU	307	302	293	293	**)	**)
C4	€/LU	307	302	293	293	**)	**)
Aid for animal husbandry, hens							
A and B	€/LU	207	203	201	172	*)	*)
C1	€/LU	199	206	201	204	**)	**)
C2	€/LU	202	206	204	207	**)	**)
C2north. and archipelago	€/LU	288	292	290	293	**)	**)
C3	€/LU	355	359	357	360	**)	**)
C4	€/LU	355	359	357	360	**)	**)
Aid for broilers and fattening poultry hens							
A and B	€/LU	196	191	187	157	*)	*)
C1	€/LU	187	196	185	171	**)	**)
C2	€/LU	191	201	190	177	**)	**)
C2north. and archipelago	€/LU	277	288	277	263	**)	**)
C3	€/LU	277	288	277	263	**)	**)
C4	€/LU	277	288	277	263	**)	**)

- Support levels for 2005–2007 are final. Support levels for 2008–2010 may change due to payment ceilings.
**) As from 2009 support paid as decoupled payment according to the farm-specific reference quantity of 2007. From 2008 to 2009 the amount of support decreases by about 6.5% when aid per hectare for livestock farms is taken into account.*
***) As from 2009 support paid as decoupled payment according to the farm-specific reference quantity of 2007. The same amount as in 2008 is paid up to 200 LU. In support areas C1 and C2 this corresponds to 286 sows or 867 fattening pig places (with an assumed three production batches a year), 16,000 hen places and 42,000–43,000 broiler places. For LUs exceeding 200 the payment is the same as in support areas A and B.*

	Unit	2005 €/unit	2006 €/unit	2007 €/unit	2008 €/unit	2009 €/unit	2010 €/unit
Northern aid paid for slaughtered animals							
Male bovines C3–C4							
P1–P2	€/animal	131	131	131	131	131	131
P3–P4	€/animal	182	182	182	182	182	182
P5	€/animal	333	333	333	333	333	333
Heifers							
A and B	€/animal	147	121	135	144	114	114
C1	€/animal	210	270	269	269	269	299
C2	€/animal	210	270	269	269	269	299
C2north. and archipelago	€/animal	259	319	318	318	318	348
C3	€/animal	301	361	360	360	360	390
C4	€/animal	387	447	446	446	446	476
Production aid for milk							
A and B	cents/l	3.3	3.3	3.5	3.5	2.8	4.0
C1	cents/l	7.6	7.6	8.4	7.8	7.6	7.7
C2	cents/l	8.2	8.2	9.0	8.5	8.3	8.4
C2north.	cents/l	9.5	9.5	10.1	9.5	9.3	9.4
C3P1	cents/l	12.5	12.5	13.1	12.5	12.3	12.4
C3P2	cents/l	14.2	14.2	14.8	14.2	14.0	14.1
C3P3–P4	cents/l	16.8	16.8	17.4	16.8	16.6	16.7
C4P4	cents/l	21.5	21.5	22.1	21.5	21.3	21.4
C4P5	cents/l	30.7	30.7	31.1	30.7	30.5	30.6
Aid for crop production							
A and B areas[1]							
Wheat	€/ha	86–105	81–105	88–105	88–105	88–105	88–105
Rye	€/ha	96–127	90–119	98–129	98–129	98–129	98–129
Malting barley	€/ha	71–84	67–84	73–84	73–84	73–84	73–84
Feed grains	€/ha	4–6	4–5	4–6	4–6	4–6	4–6
Grass	€/ha	96–127	90–119	98–129	98–129	98–129	98–129
Oil seed plants	€/ha	96–127	90–119	98–129	98–129	98–129	98–129
Starch potatoes	€/ha	96–127	90–119	98–129	98–129	98–129	98–129
Vegetables grown in the open	€/ha	326–384	306–361	333–392	333–392	333–392	333–392
C1 area[1]							
Wheat	€/ha	56	60	57	47	47	47
Rye	€/ha	112	112	112	112	112	150
Malting barley	€/ha	70	70	70	70	70	-
Oil seed plants	€/ha	100	100	100	100	100	120
Starch potatoes	€/ha	133	133	133	133	133	133
Vegetables grown in the open	€/ha	348	348	348	348	348	348
Other arable crops excl. cereals	€/ha	100	100	100	100	100	120
C2 and C2north. areas[1]							
Wheat	€/ha	56	60	57	47	47	47
Rye	€/ha	112	112	112	112	112	150
Malting barley	€/ha	70	70	70	70	70	-
Oil seed plants	€/ha	27	27	27	27	27	47
Starch potatoes	€/ha	133	133	133	133	133	133
Vegetable grown in the open	€/ha	348	348	348	348	348	348
Arable crops excl. cereals	€/ha	27	27	27	27	27	47
C3 and C4 areas							
Vegetable grown in the open	€/ha	348	348	348	348	348	348

- Support levels for 2005–2007 are final. Support levels for 2008–2010 may change due to payment ceilings.
[1] A and B area national aid for crop production, C area northern aid.

	Unit	2005 €/unit	2006 €/unit	2007 €/unit	2008 €/unit	2009 €/unit	2010 €/unit
Aid for special crops in southern Finland							
A and B areas							
Starch potatoes	€/ha				105	100	100
Vegetable grown in the open	€/ha				105	100	100
Aid per hectare of livestock farms							
A and B areas	€/ha				33	30	30
National aid for sugar beet	€/ha		60	367	350	350	35
General area payment C2–C4							
Cereals and other arable crops							
C2, C2north and archipelago	€/ha	30	30	30	30	30	33
C3	€/ha	46	46	46	46	46	49
C4	€/ha	97	97	97	97	97	100
Other crops							
C2, C2north. and archipelago	€/ha	35	35	35	35	35	33
C3	€/ha	51	51	51	51	51	49
C4	€/ha	102	102	102	102	102	100
General area payment for young farmers C1–C4	€/ha	32	32	36	36	36	36
Aid for greenhouse products A and B							
over 7 months	€/m^2	11.4	11.4	11.3	11.0	10.9	11.4
2–7 months	€/m^2	5.1	4.3	4.1	4.0	4.0	4.4
Aid for greenhouse products C1 and C2							
over 7 months	€/m^2	12.8	12.8	12.7	11.3	11.2	11.7
2–7 months	€/m^2	5.9	5.3	4.8	4.3	4.3	4.7
Aid for greenhouse products C2north							
over 7 months	€/m^2	11.4	11.4	11.3	11.3	13.2	11.7
2–7 months	€/m^2	5.3	4.8	4.3	4.3	4.3	4.7
Aid for greenhouse products C3–C4							
over 7 months	€/m^2	11.4	11.4	11.3	11.3	11.2	11.7
2–7 months	€/m^2	5.3	4.8	4.3	4.3	4.3	4.7
Northern storage aid for horticulture products							
A and B							
Storages with thermo-control system	€/m^3	10.7	12.0	11.0	13.6	14.2	14.2
Storages without thermo-control system	€/m^3	7.4	8.3	6.8	8.4	8.8	8.8
C areas							
Storages with thermo-control system	€/m^3	14.2	14.2	14.2	14.2	14.2	14.2
Storages without thermo-control system	€/m^3	9.8	9.8	8.8	8.8	8.8	8.8

- Support levels for 2005–2007 are final. Support levels for 2008–2010 may change due to payment ceilings

Conversion coefficient of livestock units in national aid

Livestock unit		Livestock unit		Livestock unit	
Suckler cows	1	She-goats	0.48	Farmed mother mallards and pheasants	0.013
Suckler cow heifers, over 2 years	1	Sows, boars	0.7	Horses	
Suckler cow heifers, 8 months–2 years	0.6	Chickens, incl. mother hens	0.013	- breeding mares (horses and ponies)	1
Bulls and steers, over 2 years	1	Broilers	0.0053	- Finnhorses, at least 1 year	0.85
Bulls and steers, 6 months–2 years	0.6	Broiler mothers	0.025	- other horses 1-3 years	0.6
Ewes	0.15	Mother geese, ducks and turkeys	0.026		

Establishment of livestock units for fattening pigs, young breeding sows, young breeding boars, turkeys, geese, ducks and farmed mallards and pheasants

13 slaughtered fattening pigs	1 LU	585 slaughtered ducks	1 LU
13 young sows or boars sold for breeding	1 LU	1,375 slaughtered farmed mallards	1 LU
223 slaughtered turkeys	1 LU	1,375 slaughtered farmed pheasants	1 LU
325 slaughtered geese	1 LU		

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Finnish Agriculture and Rural Industries 2010
ISBN 978-951-687-153-3 (Printed version)
ISSN 1798-5897 (Printed version)

Vammalan Kirjapaino Oy
2010