E-yearbook of food and natural resource statistics for 2016

Statistical facts on agriculture, forestry, fisheries and hunting in Finland

http://stat.luke.fi/en/

Natural resources and bioeconomy studies
30/2017

Luke
LUONNONVARAKESKUS

Dear reader,

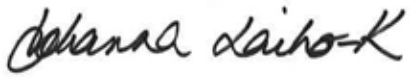
The e-yearbook of food and natural resource statistics is an annual compilation published by the Natural Resources Institute Finland (Luke). This is Luke's second publication of this kind. The publication covers the most important Finnish food and natural resource statistics and links them to our online statistical database. The publication contains bioeconomy and natural resource statistics on agriculture and the food processing industry, the forest sector, and the game and fisheries industry.

Luke's statistical e-yearbook is available in the Natural Resources Institute Finland's statistics portal at http://stat.luke.fi/en/. A traditional printed version can be ordered via the Natural Resources Institute Finland's online shop. The online publication is designed to serve as a regularly updated digital service, easily accessible via the online portal. Links to tables in the online service provide access to up-to-date statistics. Instructions on using the statistics database are available in our online portal.

The editor-in-chief of this yearbook was Development Manager Tarja Kortesmaa, and the text was edited by Senior Communications specialist Aimo Jokela. Several of Luke's statistical experts and researchers contributed to the contents and analyses presented in the publication. The layout was designed by Publication specialist Irene Murtovaara and the infographics by Graphic Design specialist Essi Puranen.

I would like to thank everyone who contributed to this publication and to Luke's statistics in general for their excellent work and know-how. Feedback and suggestions concerning the publication and our website can be sent by email to tietopalvelu@luke.fi.

Helsinki, December 2016



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Agricultural statistics

Photo: Erkki Oksanen / Luke

Agricultural statistics for 2015

The number of agricultural and horticultural enterprises continues to drop and farm sizes keep increasing

There were a total of 50,999 agricultural and horticultural enterprises in Finland in 2015. The number of farms fell by three per cent on the previous year. Approximately 8,500 farms have gone out of business since 2010. The remaining farms are growing larger. The average arable area per farm was 45 hectares in 2015. Family-run farms still accounted for 86 per cent of all farms and farming syndicates for eight per cent. Just under three per cent of all farms were run by heirs and less than two per cent by limited companies. One quarter of all farmers on privately owned farms were under the age of 43, and one quarter were over the age of 59.

Milk production the highest in 11 years

Milk production was up by just over one per cent on the previous year and amounted to 2,365 million litres. The figure was the highest in 11 years. Organic milk production was up by 15 per cent on the previous year and amounted to just over 54 million litres. However, organic milk only accounted for a couple of per cent of all milk production. The number of milk producers fell by approximately six per cent during the year, to less than 8,000. Egg production grew to just over 71 million kilograms. The figure was seven per cent higher than during the previous year and the highest since 1995. Five per cent of all eggs were organic.

Poultry meat production continued to increase

Poultry meat production has now increased every year for six years. Poultry meat production amounted to 117 million kilograms, which was just over three per cent more than in 2014. Pork production grew by approximately three per cent and amounted to 192 million kilograms. Beef production increased by four per cent and amounted to just under 86 million kilograms.

Rye was the only cereal whose cultivation area increased

Cereals were still grown on half of all the 2.3 million hectares of arable land in Finland, but the cultivation areas of barley, oats, and wheat all decreased by approximately 20,000 hectares on the previous year. Rye was the only cereal whose cultivation area increased. The increase equated to one third of the previous year's cultivation area. As the cultivation areas of cereals shrank, the cultivation areas of other crops increased: The pea cultivation area doubled, the broad bean cultivation area grew by half, and the cultivation area of turnip rape and oilseed rape increased by one third compared to the previous year.

The quality of the wheat harvest left a lot to be desired

The wheat harvest was the second highest since the compiling of statistics began one hundred years ago and amounted to almost one billion kilograms, but only approximately 18 per cent of the harvest met the baking quality criteria. The rye harvest increased by almost 45 per cent on the year 2014, amounting to almost 110 million kilograms and meeting domestic demand for the first time in 15 years. Approximately nine per cent of the 2015

http://stat.luke.fi/en/

rye harvest, i.e. just over five million kilograms, was organic. Of all organic cereals, the organic oat harvest was the highest at approximately 45 million kilograms.

Horticultural production

Outdoor vegetable production fell short of the previous year's figure by approximately 10 per cent and amounted to 166 million kilograms. Carrots were the biggest crop, but the harvest fell 10 million kilograms short of the previous year's figure and amounted to approximately 64 million kilograms. Of greenhouse crops, the cucumber harvest exceeded the tomato harvest for the first time. Cucumber production amounted to 40 million kilograms and tomato production to 38 million kilograms. Special tomatoes were included in statistics for the first time, and they accounted for 10 per cent of the total tomato harvest. The total production of potted vegetables hit a new record high with 112 million pots. Berry production also hit a record with 17 million kilograms, of which strawberries accounted for 14 million kilograms.

Industrial use of cereals increased

The industrial sector consumed a total of 1.4 billion kilograms of domestic and imported cereals in 2015, which was a couple of per cent more than during the previous year. The food industry consumed almost one third of all cereals and the feed industry just under half. Barley consumption was the highest with 550 million kilograms, of which just over 40 per cent was used to produce animal feed. A total of almost 460 million kilograms of wheat was turned into food products and animal feed.

Producer prices for agricultural products

The producer price for milk fell by 14 per cent on the previous year. The average producer prices for beef, pork, and poultry meat decreased for the second year in a row, and the producer price for lamb also took a downward turn in 2015. The producer prices for cereals, on the other hand, stopped declining. Producers received two per cent more for eggs than during the previous year. Producers were paid 13 per cent more for barn and free-range eggs than for enriched cage eggs. The producer price for organic eggs was on average four per cent higher than during the previous year.

Profitability of agriculture

The average profitability of agriculture has been decreasing throughout the 21st century, despite the fact that the most poorly performing farms are closing down due to heavy restructuring in the sector. In 2014, the profitability ratio stood at 0.37, and the return on total assets was negative by two per cent. As a rule, livestock farms are more profitable than crop farms. Despite the poor profitability, the solvency of farms has nevertheless remained at a relatively healthy level on average.

Meat and egg consumption increased

The total consumption of meat grew by approximately three per cent on 2014. The consumption of poultry meat increased the most, by seven per cent. Approximately six per cent more eggs were consumed than during the previous year.

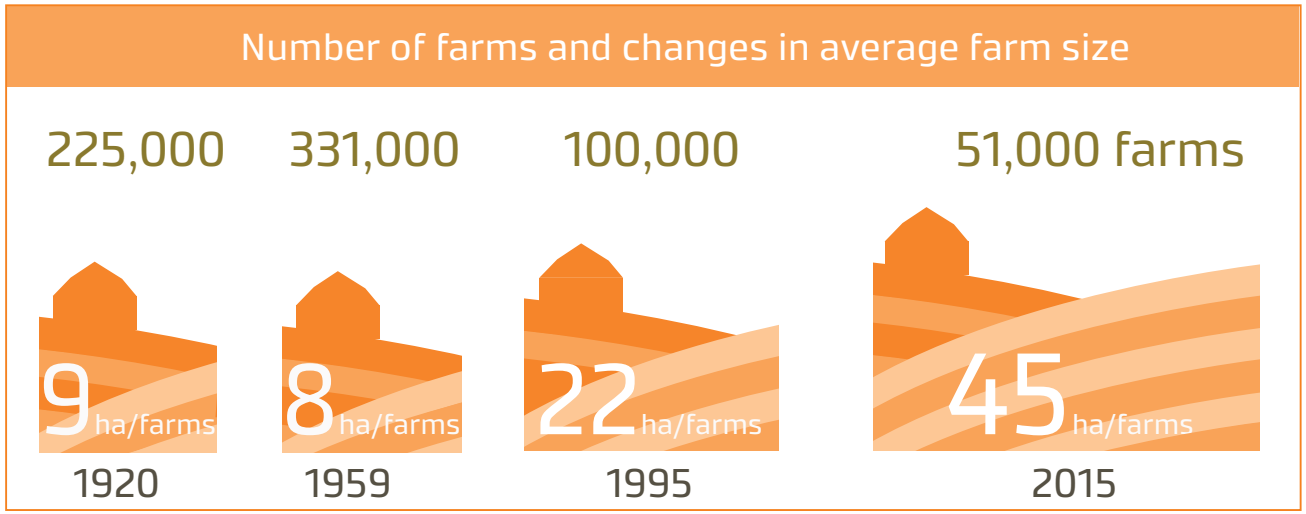
Structure of agriculture

There were a total of 50,999 agricultural and horticultural enterprises in Finland in 2015. The number of farms decreased by approximately three per cent, or 1,800 farms, on the previous year. The average size of farms is now approximately 45 hectares. The fields of farms that go out of business are often rented by others. One third of all fields are rented.

Statistics on the number of farms go back as far as 1920

Statistics have been compiled on the number of farms in Finland since 1920. The number of farms was approximately 225,000 at that time. The number of farms increased after the wars and reached its peak in the late 1950s and early 1960s with approximately 330,000. Since then, the number has been decreasing. In 1995 when Finland joined the European Union, there were approximately 100,000 farms in the country.

The methods used to compile statistics on farms have changed several times over the years. The latest reform was carried out in 2013, when the register of agricultural and horticultural enterprises was established. Data on the number of farms according to the classification used in the new register are available from the year 2010 onwards.



Other plant production is becoming more widespread

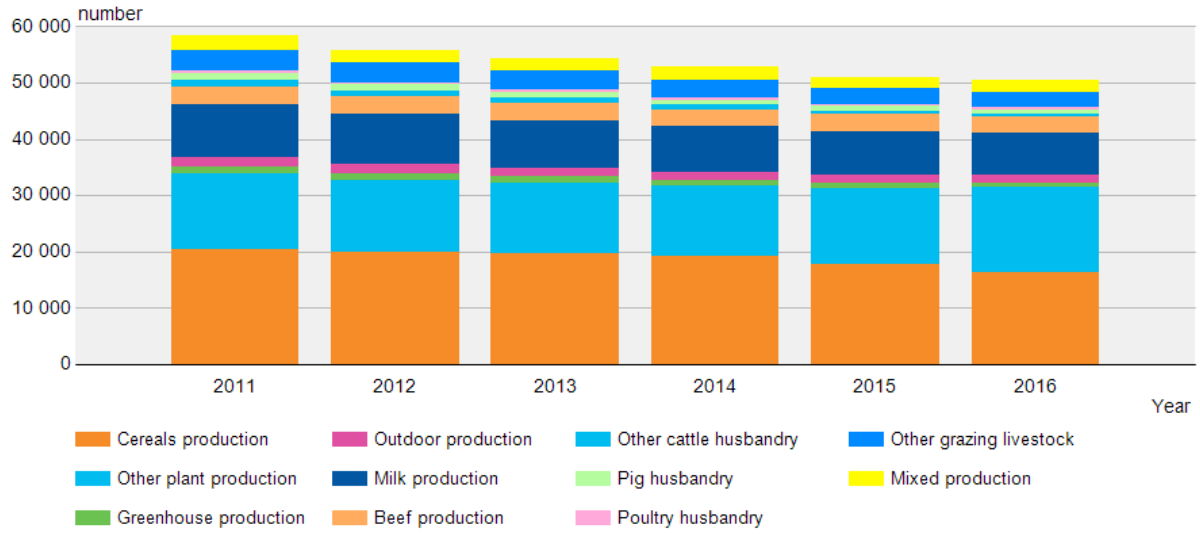
Two in three Finnish farms are primarily crop farms and 30 per cent are primarily livestock farms. Most livestock farms focus on dairy cattle, which was the primary production sector on approximately 7,700 farms in 2015. The rest of Finnish farms are mixed farms with no clear primary production sector.

Cereal production was the most common primary production sector in 2015, and approximately 18,800 farms focused primarily on cereals. However, the percentage of farms that have other plant production as their primary production sector increased. The cultivation area of cereals has shrunk two years in a row. The cultivation areas of grass and other crops have grown. Other plant production was the primarily production sector on 13,500 farms.

An agricultural or horticultural enterprise's production sector is its economically most important production sector based on standard output (SO). If a farm makes more than two thirds of its total revenue from a single product, that product is considered to represent its primary production sector. If no product generates more than two thirds of a farm's revenue, the farm is classified as a mixed farm.

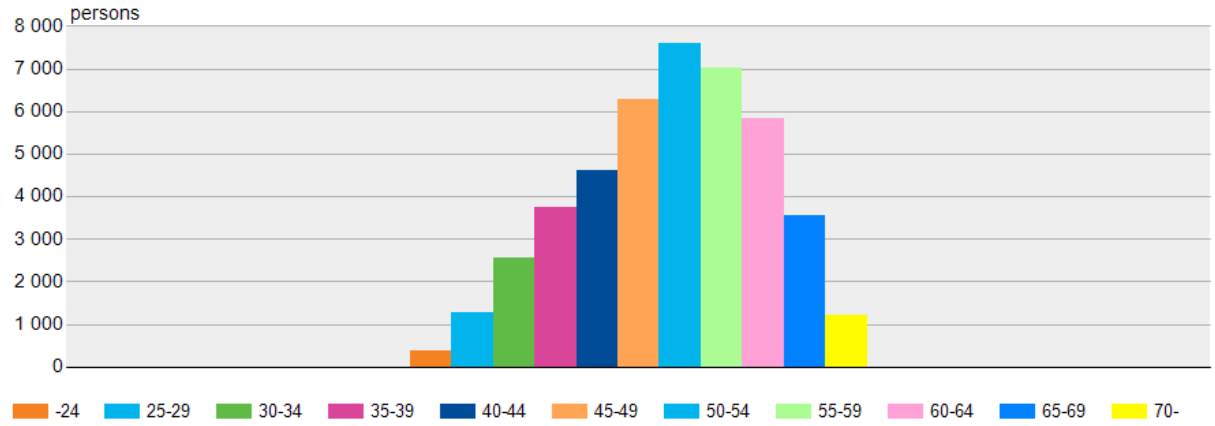
Number of agricultural and horticultural enterprises by production sector

Background data as a table



Number of farmers by age group on privately owned farms, 2015

Background data as a table



One in four farmers is over 59 years old

A total of 86 per cent of Finnish farms are owned by private individuals, and they are therefore considered to be family-run farms. The average age of farmers on these farms was 50.8 years. One in four farmers was over 59 years old. The number of farmers aged over 65 is increasing. The numbers of farmers under the age of 30 and over the age of 65 have increased slightly on the previous year. The numbers of farmers in all other age groups have decreased. The number of family-run farms has decreased by approximately 1,600 on the previous year.

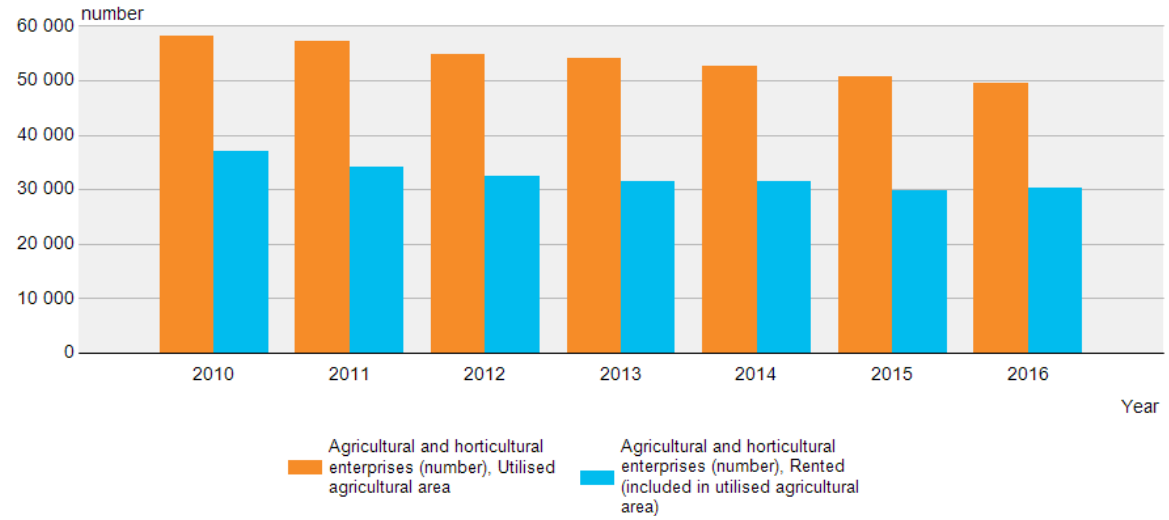
One third of all fields are rented

The area of utilised agricultural area has remained largely unchanged at approximately 2.3 million hectares year after year. The fields of farms that go out of business are either bought or rented by others. In 2015, approximately one third of all cultivated agricultural land was rented, and almost 60 per cent of farms had rented fields.

- Structure of agricultural and horticultural enterprises
- Agricultural and horticultural labour force
- Other entrepreneurship in agriculture and horticulture
- Energy consumption in agriculture and horticulture

Agricultural and horticultural enterprises with utilised agricultural area and number of farms with rented land

Background data as a table



Statistics on agricultural and horticultural labour force and other business activities of agricultural and horticultural enterprises are compiled every three to four years. The next set of statistics will be available in the autumn of 2017.

Photo: Luke's photo archive

Livestock production

The production of all livestock products increased in 2015. Milk production grew by one per cent and was the highest in 12 years. Records were broken in poultry meat production, which amounted to just over 117 million kilograms. Pork and beef production also grew on the previous year thanks to an increase in slaughter volumes and weights. Egg production was at its highest level in 20 years.

Milk production at its highest in 11 years

There are milk producers all over Finland, including the northernmost Lapland. In 2015, milk was produced in 300 of the 317 municipalities in Finland.

Milk production grew by just over one per cent last year and amounted to 2,365 million litres. The 2015 production volume was the highest in 11 years. The milk quotas that were introduced in 1985 were abolished in March 2015. Milk quotas were used to regulate milk production in Finland and other EU countries.

Structural development in milk production has been rapid

Structural development in milk production has been rapid, as the number of producers has dropped by almost half in 10 years. At the end of last year, 7,890 farms supplied milk to dairies.

The average volume of milk supplied to dairies was 279,800 litres per farm in 2015. As production techniques have become more efficient, the volume of milk per farm has doubled in the last 10 years.

The average production amounts of cows have increased due to more efficient animal breeding and feeding, and the increasing competence of entrepreneurs. Last year, the average production amount of dairy cows grew to 8,300 litres; at the beginning of the millennium, the average cow produced 6,800 litres of milk.

Kuopio became the largest milk producer

Last year, milk production increased in the areas of all ELY centres except Satakunta and North Karelia.

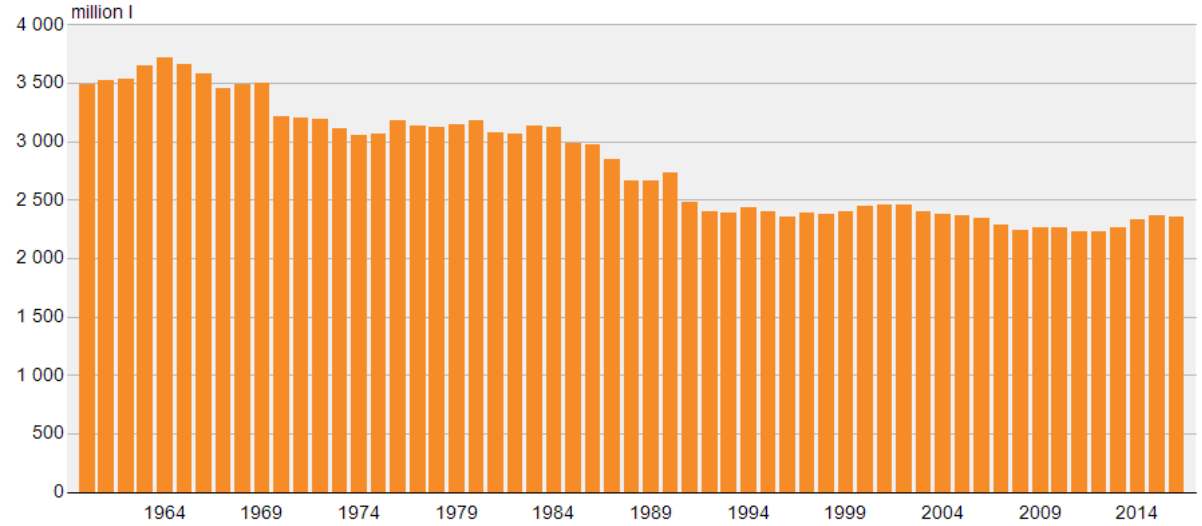
Municipal mergers made Kuopio the biggest milk producer in the country last year, when Kuopio and Maaninka were amalgamated. Kuopio produced just under 56 million litres of milk. The next biggest milk producers were Kokkola and Kiuruvesi.

- Milk and milk product statistics
- Milk production by region

Photo: Luke's photo archive

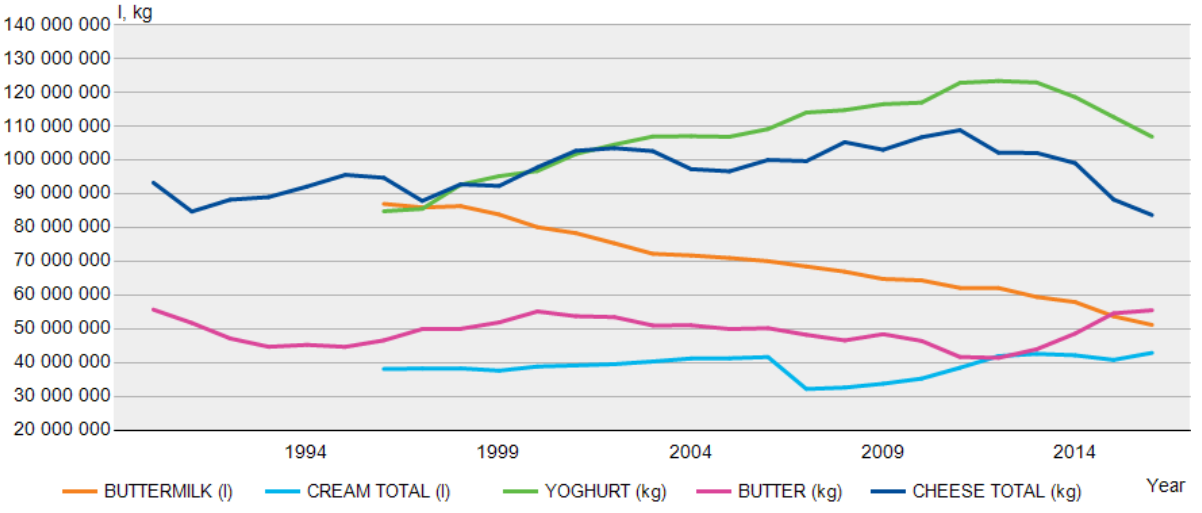
Milk production, 1960–2015

Background data as a table



Production of milk products, 1990–2015

Background data as a table



Production of fresh dairy products continued to decrease

The production of fresh dairy products amounted to just over 970 million kilograms last year, which was four per cent less than during the previous year. Production volumes decreased in almost all categories of fresh dairy products, but the production of milk decreased the most by volume.

Milk makes up the majority of fresh dairy products (73%). Yoghurt accounted for 12 per cent, buttermilk for six per cent, cream for four per cent, and other fresh dairy products for five per cent.

Cheese production fell while butter production increased

Cheese production amounted to 88 million kilograms last year. The amount was 11 per cent less than during the previous year, and last year's production volume was the lowest in almost 20 years. Butter production, on the other hand, increased by 11 per cent last year and amounted to just under 49 million kilograms. The overproduction of milk, Russian import restrictions, and the poor market situation have contributed to the increase in the production volumes of butter and powders and to the decrease in the production of cheese and fresh dairy products.

Slightly more meat was produced than during the previous year

Meat production grew to just under 398 million kilograms last year, which was three per cent more than during the

previous year. Beef, pork, poultry meat, and lamb production all increased on the previous year. Pork accounted for approximately 48 per cent, poultry meat for 30 per cent, beef for 22 per cent, and lamb for less than half a per cent of the total amount of meat produced.

Beef production increased by four per cent

Beef production increased by four per cent and amounted to just under 86 million kilograms. The increase was the result of higher slaughter volumes and average weights. A higher amount of beef than last year was last produced in 2007.

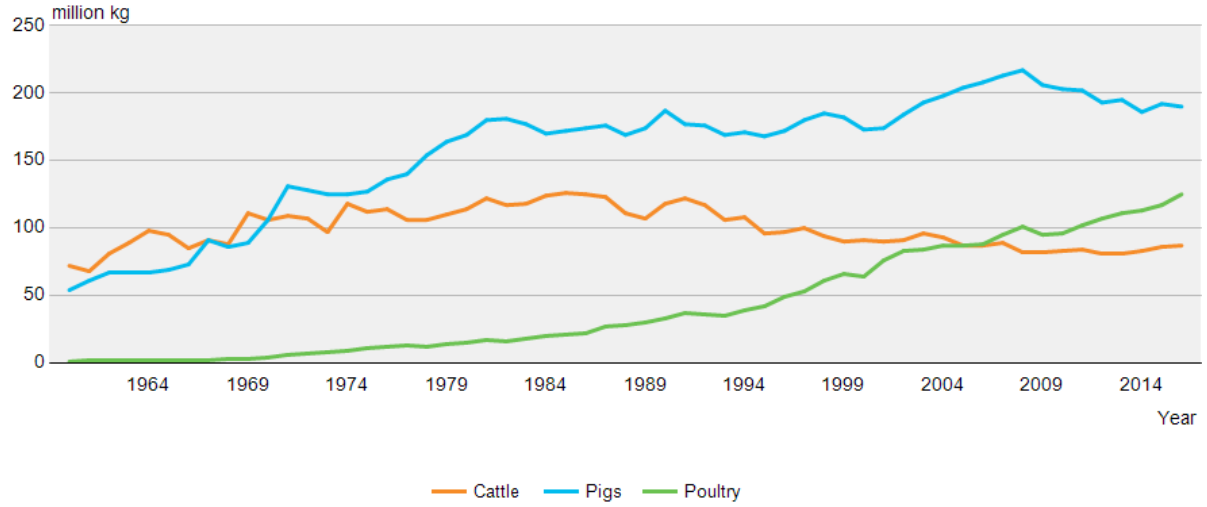
Beef production has declined as a result of a decrease in the number of dairy cows in recent decades. An increase in the number of suckler cows and higher slaughter weights have slowed down the decline in production volumes. Since the compiling of statistics began in the 1950s, beef production volumes have been at their highest in the mid-1980s, when 125 million kilograms of beef was produced.

Beef production increased in the areas of all ELY Centres

Beef production increased in the areas of all ELY Centres last year. The biggest increases in production volumes were recorded in Ostrobothnia and Northern Ostrobothnia, were the increase amounted to just over half a million kilograms. Similarly to previous years, the biggest beef producer was Kiuruvesi (3.4 million kilograms).

Beef, pork, and poultry meat production, 1960-2015

Background data as a table



Next came Kuopio (2.3 million kilograms) and Kauhava (1.9 million kilograms).

More pork that during the previous year

A total of 192 million kilograms of pork was produced in 2015, which was approximately three per cent more than during the previous year. Just over two million pigs were slaughtered, and the average weight of pigs grew by a couple of kilograms to just over 90 kilograms last year.

Pork production is concentrated in the fertile cereal production regions of Southwest Finland and Ostrobothnia. In fact, the combined production volumes of these regions account for more 60 per cent of the total production volume.

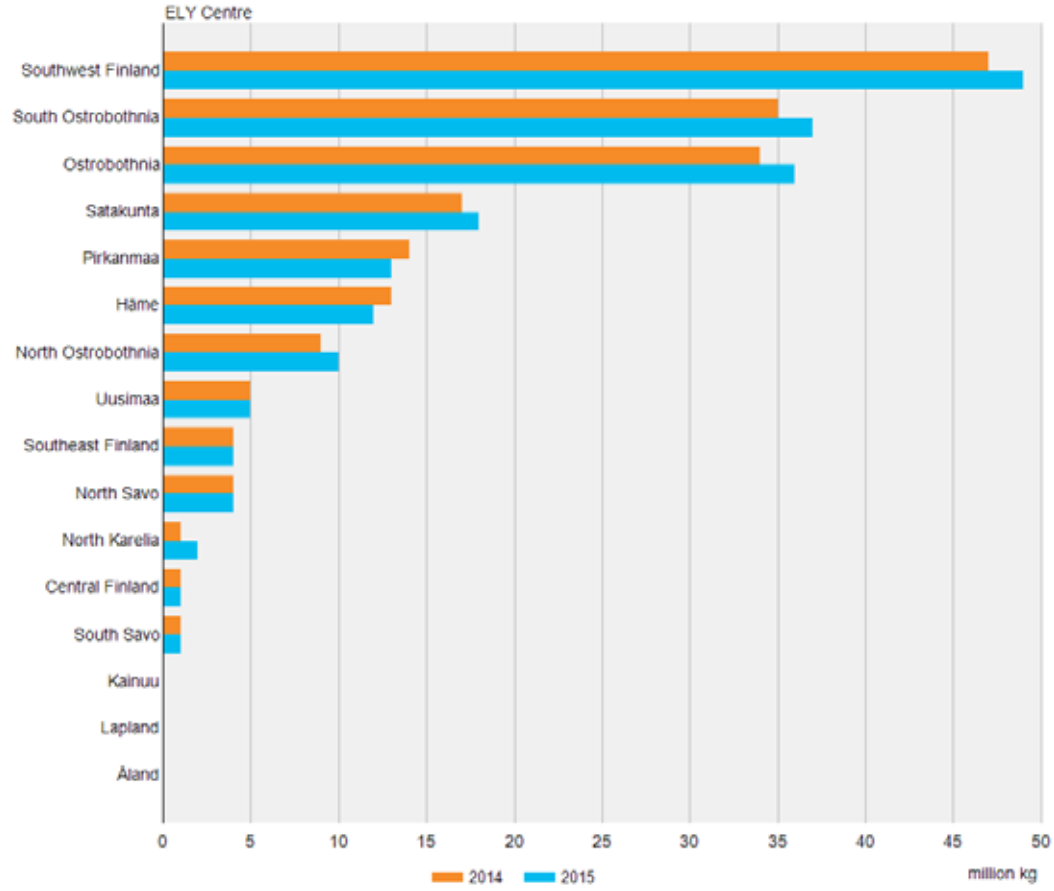
Production volumes increased in the areas of several ELY Centres. On a municipal level, the biggest pork producers are Huittinen and Loimaa, both of which produced approximately 12.7 million kilograms of pork last year. The third largest pork producer was Ilmajoki (10.5 million kilograms).

Another record in poultry meat production

Poultry meat production increased to just over 117 million kilograms last year thanks to growing demand. Production grew for the sixth year in a row and reached a new record high with an increase of just over three per cent on the previous year. Both broiler meat and turkey meat production increased.

Pork production by ELY Centre, 2014 and 2015

▶ Background data as a table



Broiler meat has been produced in Finland since the turn of the 1950s and 1960s. Poultry meat production volumes were still low in the 1960s, but grew steadily year by year, surpassing beef production in 2005. Broiler meat accounts for just over 90 per cent of all poultry meat. Turkey meat production, on the other hand, has dropped to almost half of the highest production volumes recorded. Last year, turkey meat production amounted to just over 7.5 million kilograms.

▶ Meat production

▶ Meat production by region

Egg production increased slightly

Egg production grew to just over 71 million kilograms last year. Production increased by seven per cent on the previous year. Last year's production volume was the highest in 20 years, as the last time more eggs were produced was in 1995. The highest egg production volume was recorded in 1984 (88 million kilograms) and the lowest at the beginning of the 1950s (25 million kilograms).

A total of 62 per cent of all eggs were produced in enriched battery cages, 33 per cent came from barn and free-range hen houses, and five per cent were organic. The production of organic eggs increased by just over 10 per cent last year and the production of barn and cage eggs by seven per cent each on the previous year.

▶ Egg production

Cattle numbers remained unchanged

Farms had a total of 914,700 cows, which was almost as many as a year earlier. Cows were kept on a total of 12,390 farms.

Dairy cows numbered just over 285,000 in the spring of 2015. No major changes have taken place in the number of dairy cows in recent years despite the drop in the number of dairy farms. The remaining farms have increased their production volumes, and the average size of a dairy cattle herd has almost doubled in the last 10 years. The average number of dairy cows per farm was 33 last year. The highest cow numbers were recorded in the 1960s,

when they numbered just over 1.1 million. The average number of cows per farm was less than five at the time.

The number of suckler cows has increased almost every year in the 21st century, and it has almost doubled in the last 10 years. The number of suckler cows grew to just under 59,000 last year, and there were approximately 2,180 farms that kept them.

Slightly fewer pigs than during the previous year

Pigs were kept on 1,320 farms in the spring of 2015, and they numbered approximately 1.24 million, which was slightly less than during the previous year. Sows numbered approximately 23,000. The number of pig farms has more than halved in 10 years. Over the same period of time, the number of pigs has dropped by approximately 10 per cent and the number of sows by almost one third.

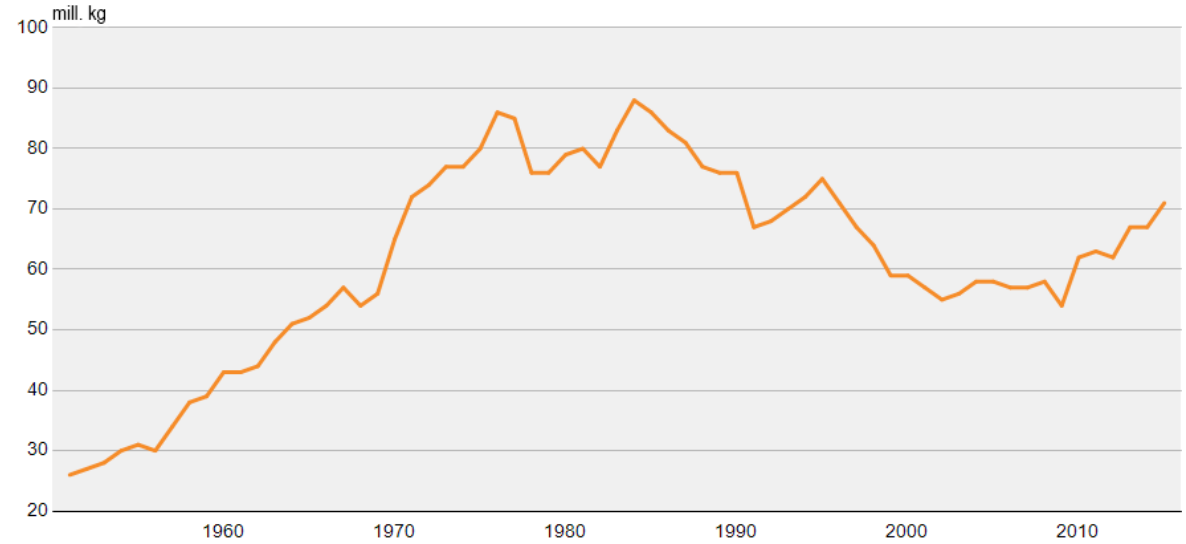
The highest pig numbers were recorded towards the end of the 2000s (1.5 million). Since the compiling of statistics began in the 1920s, the lowest pig numbers have been recorded during the war in the 1940s (0.3 million).

Chicken numbers were the highest in Southwest Finland and broiler numbers in Ostrobothnia

On 1 April 2015, there were approximately 12 million poultry on farms, which was four per cent less than during the previous year. Broilers accounted for just under 60 per cent, chickens for 30 per cent, and turkeys, broil-

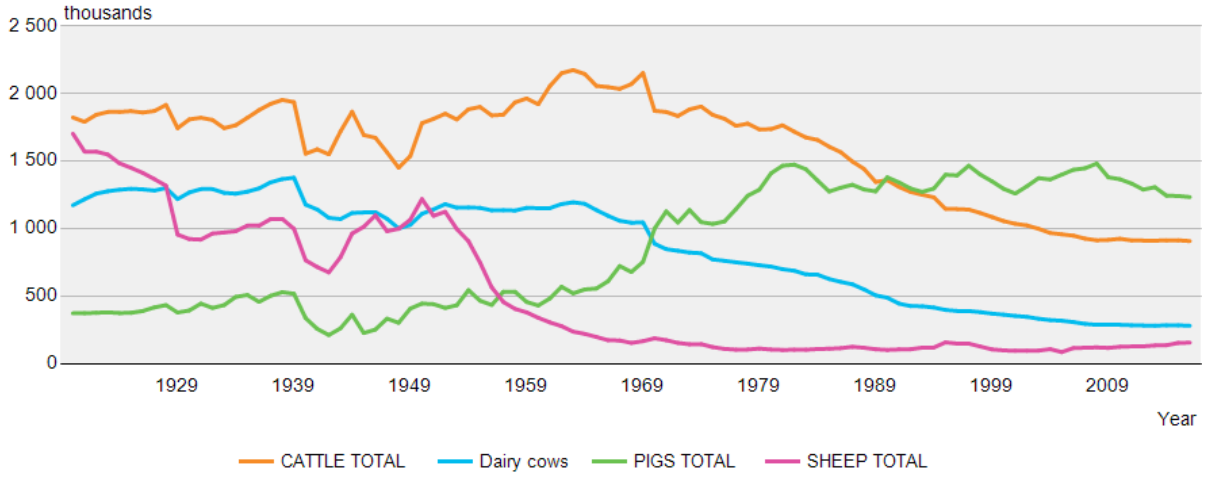
Egg production, 1951–2015

Background data as a table



Number of cattle, pigs and sheep, 1920–2015

Background data as a table



er breeder hens, and other poultry for 10 per cent of the total. Poultry were kept on a total of approximately 1,300 farms. The number includes all farms that have at least one poultry bird. Poultry production was the main production line on 400 farms.

Broilers numbered approximately seven million in the spring, and they were kept on 124 farms. Broiler numbers were the highest (1 April 2015) in Seinäjoki, Huittinen, Kangasala, Pöytyä, and Lapua, each of which had more than half a million broilers.

At the beginning of April, there were just over 3.5 million chickens on farms, which was slightly less than a year earlier. Just over 60 per cent of all chickens were kept on farms in Southwest Finland. Chicken numbers were the highest in Loimaa, Laitila, and Oripää.

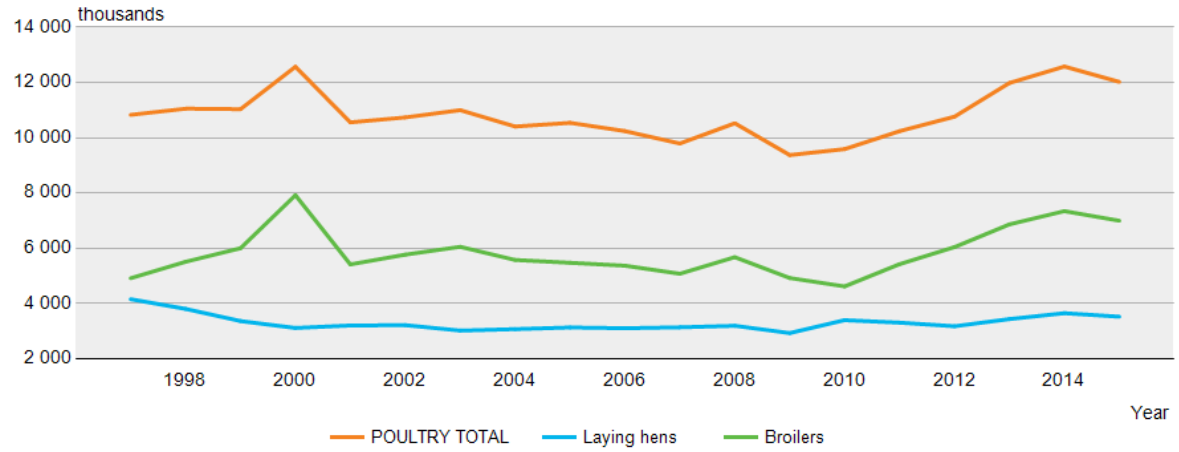
Sheep numbers at their highest in 20 years

Sheep numbered 155,000 in the spring of 2015, of which approximately 74,000 were ewes. Sheep were kept on 1,450 farms. The number of sheep has been increasing in recent years, and the average size of sheep farms has grown. The average number of ewes per farm was 54 last year. In light of statistics, sheep numbers have been the highest in the 1920s (1.7 million) and the lowest in the 2000s (90,000). There are sheep farms all over the country. The highest sheep numbers are found in Southwest Finland, Ostrobothnia, and Lapland.

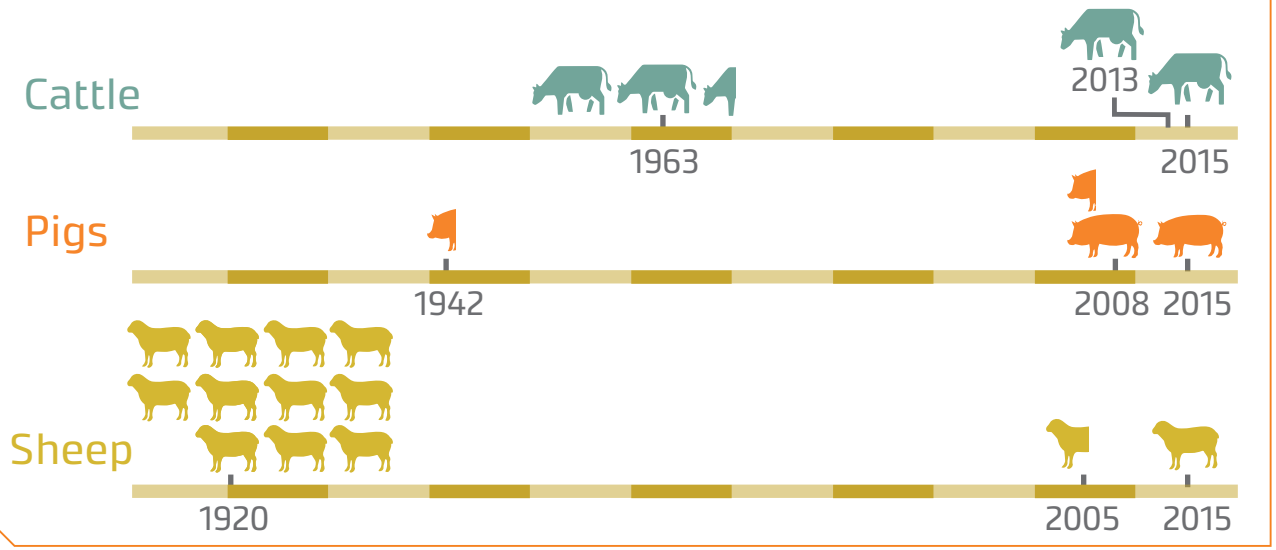
Number of livestock

Number of poultry, 1997–2015

Background data as a table



Number of livestock in 2015 and relative to years with the highest and lowest figures



Arable crops

Cereals were grown on half of all the approximately 2.3 million hectares of arable land in Finland in 2015. Grass and fallow accounted for the majority of the rest. The remaining 10 per cent of arable land was used to grow a variety of different crops.

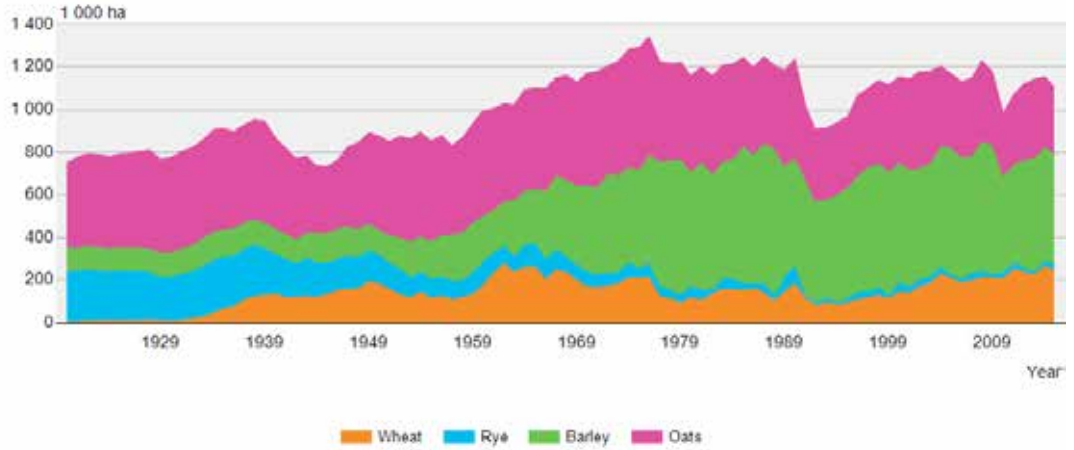
The cultivation areas of all three of the most cultivated cereals – barley, oats, and wheat – shrank by approximately 20,000 hectares on the previous year. The cultivation area of barley, which is the most important cereal, still exceeded 500,000 hectares. Rye was the only cereal whose cultivation area grew – by almost 8,000 hectares – which brought the total cultivation area of rye to almost 32,000 hectares.

Decrease in the cultivation areas of cereals made room for more special crops

The total cultivation area has remained almost unchanged for decades. The decrease in the cultivation areas of cereals has made room for more special crops. The pea cultivation area doubled in the summer of 2015, the broad bean cultivation area grew by half, and the cultivation area of turnip rape and oilseed rape increased by one third compared to the previous year.

Cereal production area, 1920–2015

Background data as a table



Fodder grass production area, 1920–2015

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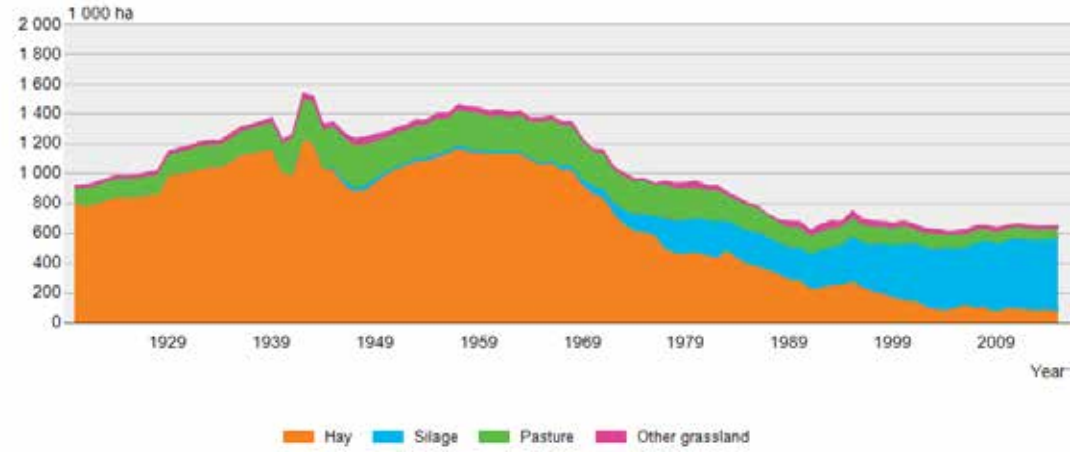
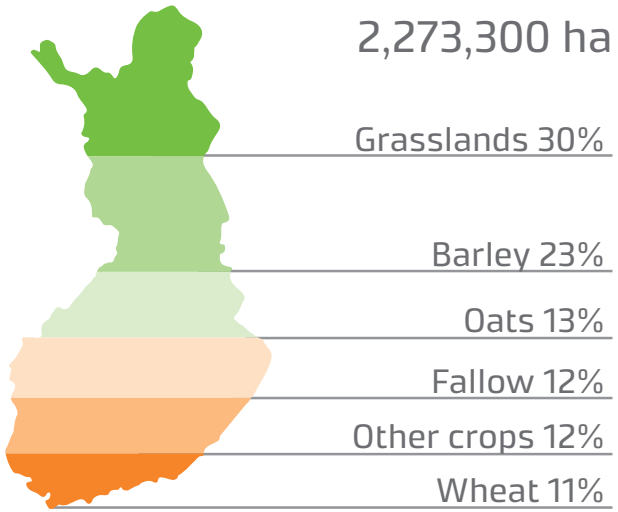


Utilized agricultural area, 2015



2,273,300 ha

Grasslands 30%

Barley 23%

Oats 13%

Fallow 12%

Other crops 12%

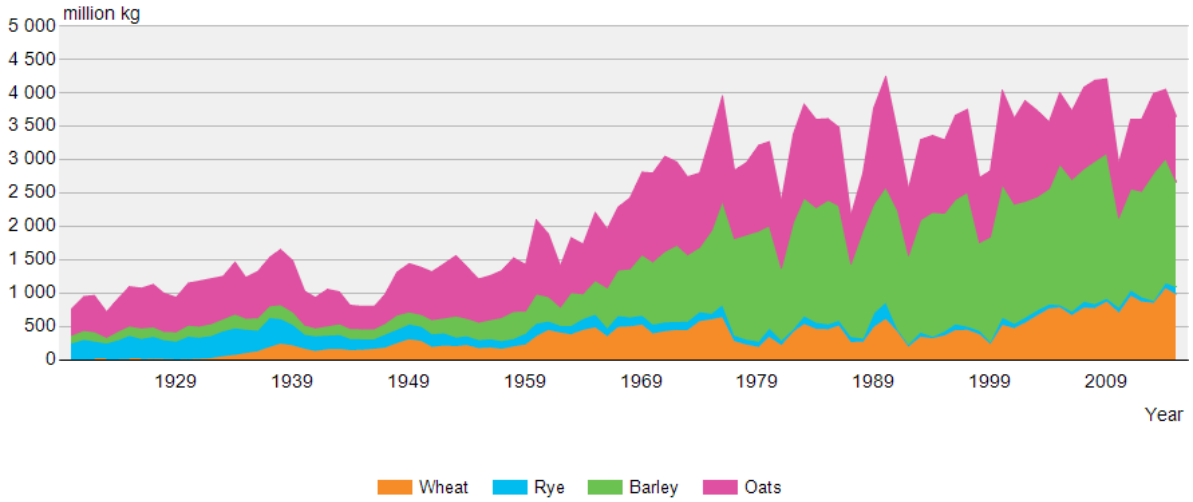
Wheat 11%

7% of Finland's area

▶ Utilised agricultural area

Cereal harvest, 1920–2015

▶ Background data as a table



Cereal harvest shrank by more than 10 per cent

The cereal harvest shrank by 11 per cent in 2015 after two peak years. Barley, oats, and wheat harvests fell, while the rye harvest grew by almost 45 per cent on 2014.

Ample wheat harvest but of poor quality

The wheat harvest was good volume-wise: almost one billion kilograms. The harvest was the second highest since the compiling of statistics began 100 years ago. However, the baking quality of the wheat was poor. Only approximately 18 per cent of the harvest met the baking quality criteria. The last time that the quantity of baking-quality wheat was this low was seven years ago.

Record-breaking rye and winter wheat harvests

The per-hectare yields of winter grains, i.e. winter rye and wheat, were at a record high across the country. As the area sown in the autumn was also larger than average, the winter wheat harvest ended up being the third highest in the 100 years of recorded harvest history. The large rye harvest of almost 110 million kilograms guaranteed a sufficient domestic supply of bread rye for the entire harvest year for the first time in 15 years.

Pea and broad bean harvests nearly doubled

The pea harvest (25 million kilograms) grew by more than 75 per cent on the previous year and the broad bean harvest (27 million kilograms) by 25 per cent. The growth in

harvest volumes was helped along by the doubling of the pea cultivation area and the increase of the broad bean cultivation area by more than 50 per cent. The cultivation areas of both pulses matched that of sugar beet, amounting to more than 10,000 hectares.

It is estimated that only 15 per cent of the proteins used in livestock feed are produced in Finland.

Potato harvest was low

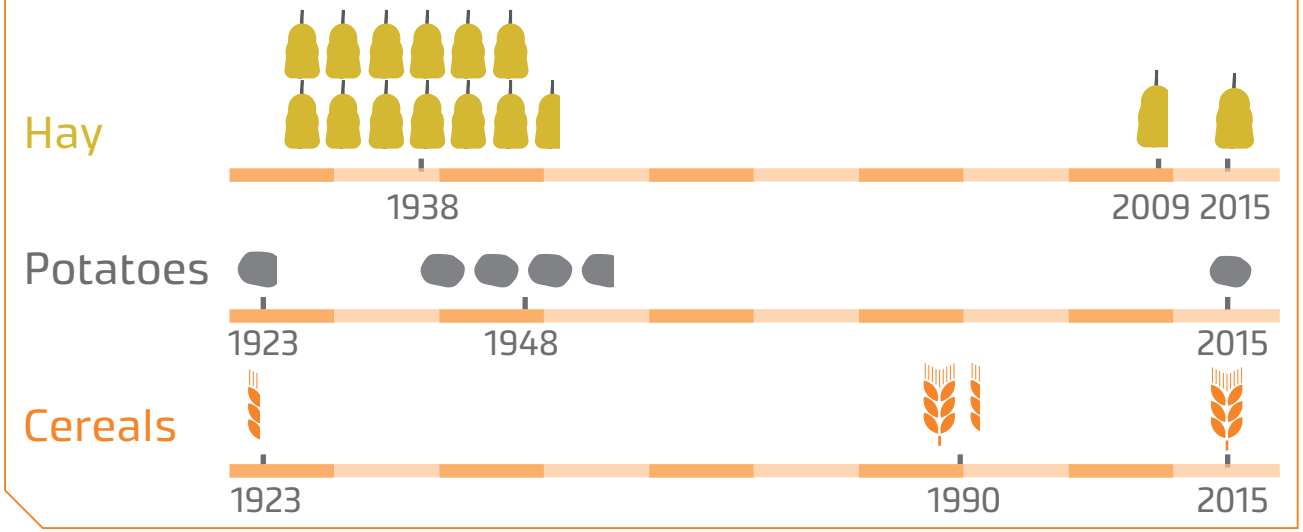
The potato harvest decreased by 10 per cent on the 2014 harvest. The per-hectare yield of potato amounted to just under 25 tonnes per hectare. This was the third time in the last decade that the per-hectare yield failed to reach 25 tonnes.

Record harvest of green cereals

Most of the approximately 650,000 hectares of fodder grass is harvested for silage, and only approximately one

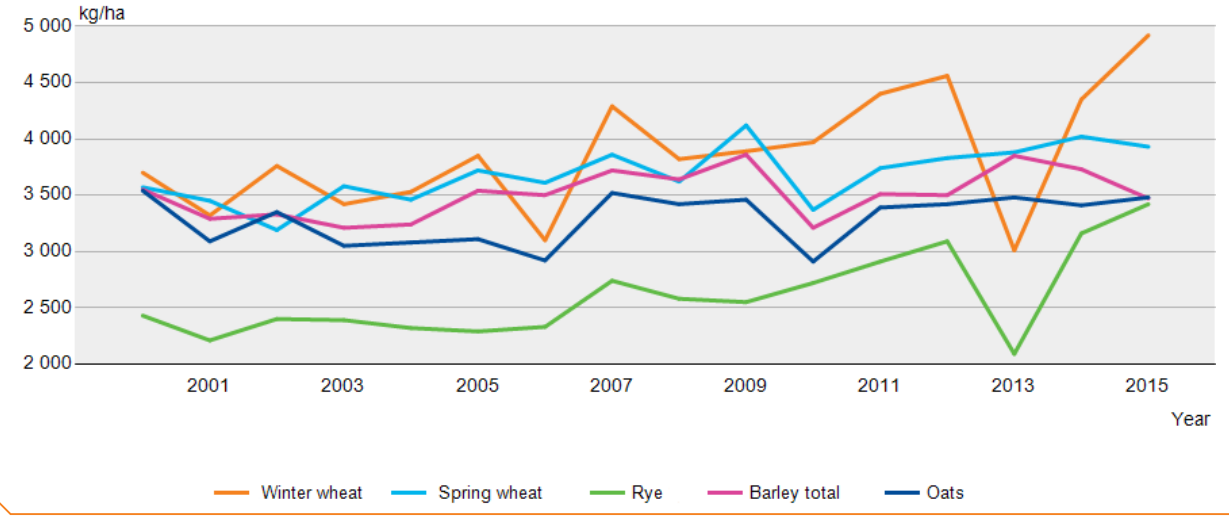
Photo: Erkki Oksanen / Luke

Best and worst harvest years, compared to 2015



Per-hectare yields of cereals, 2000–2015

▶ Background data as a table



sixth is harvested for hay. The silage harvest grew by five per cent on 2014. The hay harvest was average. The cultivation area of cereals that are harvested green exceeded that of hay. More than 100,000 hectares of cereals were harvested green and turned into livestock feed and silage.

▶ Crop production statistics

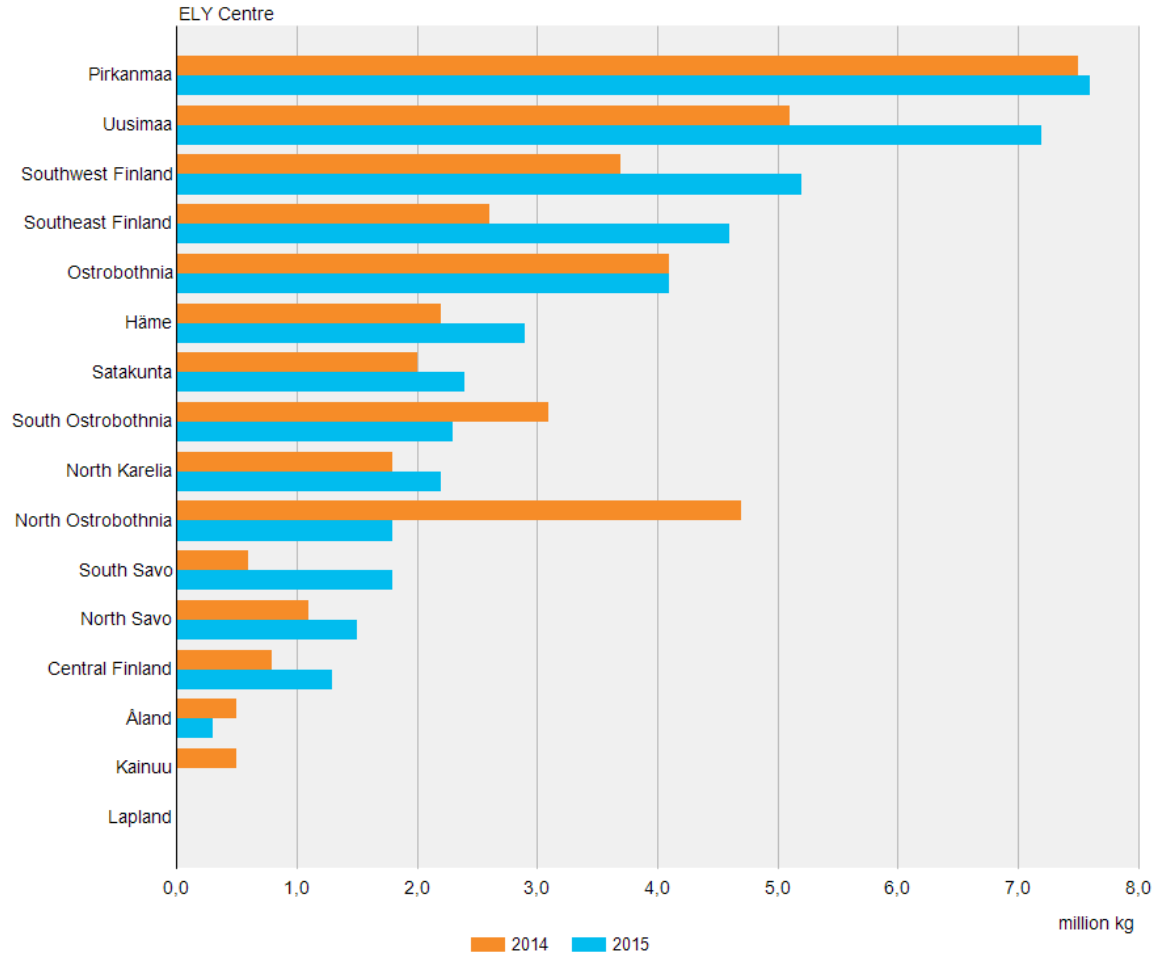
Organic cereal production still rare

Organic cereals accounted for 2.3 per cent of the total cereal harvest in 2015. Rye is the most organic of Finland's cereal crops. Approximately eight per cent of the 2015 rye harvest, i.e. approximately nine million kilograms, was organic. Of all organic cereals, the organic oats harvest was the highest at approximately 45 million kilograms.

The organic silage harvest has tripled in six years.

Organic production of oats by ELY Centre, 2014–2015

▶ Background data as a table



Organic crops accounted for a larger percentage of pea, broad bean, fodder grass, and cereal feed production than of other crop production: between 10 and 20 per cent. The increase in organic livestock production has therefore also affected crop production, in the form of higher organic animal feed production volumes in particular.

▶ Organic production statistics

Horticultural production

A total of 16,628 hectares of fields and 392 hectares of greenhouses were used for horticultural production in 2015. Horticultural enterprises numbered 3,613, which was approximately one third of the figure of approximately 20 years ago. The area used for horticultural production peaked at approximately 19,000 hectares towards the end of the 1990s. The production area has remained at approximately 16,000 hectares for the last few years.

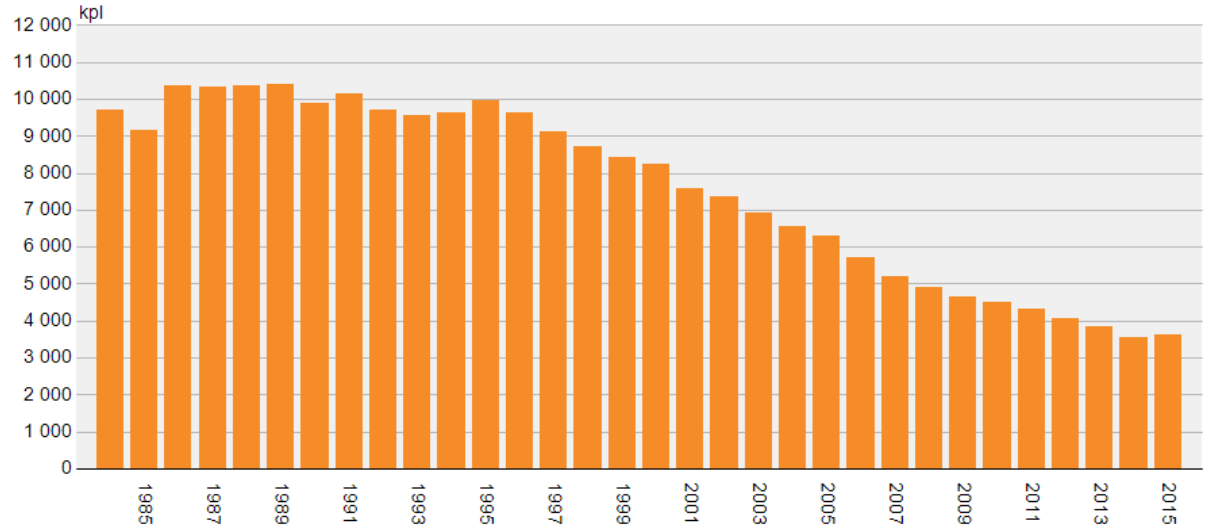
A summer of record harvests with the exception of carrots

The 2015 growing season saw record-breaking harvests of strawberries, raspberries, and apples. Berry production amounted to 17 million kilograms and apple production to six million kilograms. The total amount of greenhouse vegetables produced for sale reached the usual level of 83 million kilograms, but the total harvest of outdoor vegetables amounted to just 166 million kilograms. The drop in the outdoor production volume was due to the carrot harvest. The harvest of carrots, which are the most important outdoor vegetable volume-wise, was down by 10 million kilograms on the previous year and amounted to less than 64 million kilograms.

Bulb flowers and bedding plants kept their status

Ornamental plants were grown across an area of 123 hectares in greenhouses. Greenhouses produced 74 million bulb flowers, 37 million bedding plants and just under 10 million flowering potted plants and foliage plants. Cut flowers were only grown across an area of 39,000 square metres.

Number of horticultural enterprises, 1984-2015



Background data as a table

Four million kilograms of special tomatoes

Tomato harvests have exceeded greenhouse cucumber harvests every year since the compiling of horticultural statistics began. The cultivation of more special tomato varieties, such as cherry tomatoes, plum tomatoes, and beef tomatoes, has been increasing, and their harvests amounted to almost four million kilograms, while the total tomato harvest was 38 million kilograms.

However, the cucumber harvest exceeded the tomato harvest in 2015. Cucumber production amounted to 40 million kilograms and tomato production to 38 million kilograms. Greenhouse vegetable production remained unchanged at 83 million kilograms. The total production of potted vegetables rose to a new record: 112 million pots.

Horticultural statistics

High tunnel production increases berry harvests

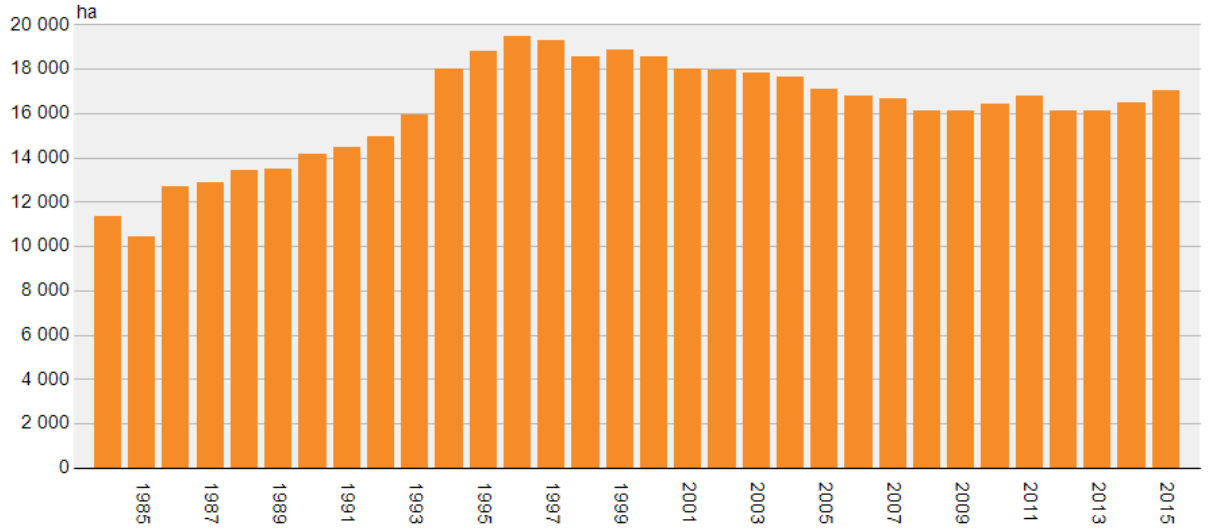
The introduction of high tunnel production has increased berry harvests in particular. The berries most commonly grown in high tunnels are strawberries and raspberries. The high tunnel production of berries is included in the statistics for the first time in 2015, and berries were grown in high tunnels across an area of 19 hectares.

High tunnel production refers to growing crops in a tunnel made of steel hoops and covered by a single sheet of plastic, which is removed for the winter.

Photo: AnnaMarja Vilander

Changes in horticultural production area, 1984–2015

▶ Background data as a table



Production of vegetables, berries and fruit, 2015

Total 272 million kg

166 million kg
Outdoor vegetables

84 million kg
Greenhouse vegetables (incl. potted vegetables)

22 million kg
Berries and fruit

Use and stocks of agricultural products

Finnish fields produce approximately four billion kilograms of cereals each year. The majority of the harvest is used as livestock feed on farms. One third ends up in industrial processes.

Cereals and turnip rape from farms to market

Cereal wholesalers and the industries that use cereals purchased a total of 2.1 billion kilograms of cereals from farms in 2015. The figure was slightly lower than during the previous year.

Farms' barley sales were the highest with 800 million kilograms, of which one fifth was malting barley and the rest was feed barley. Wheat sales were the second highest with 660 million kilograms. Just over one third of the wheat bought from farms was bread wheat and the rest was feed wheat. Oat sales were lower than during the previous year: 550 million kilograms. Rye sales amounted to 83 million kilograms, but the figure was almost double that of the previous year.

Farms' turnip rape and oilseed rape sales were higher than during the previous year: 58 million kilograms.

Majority of cereals consumed by the feed industry

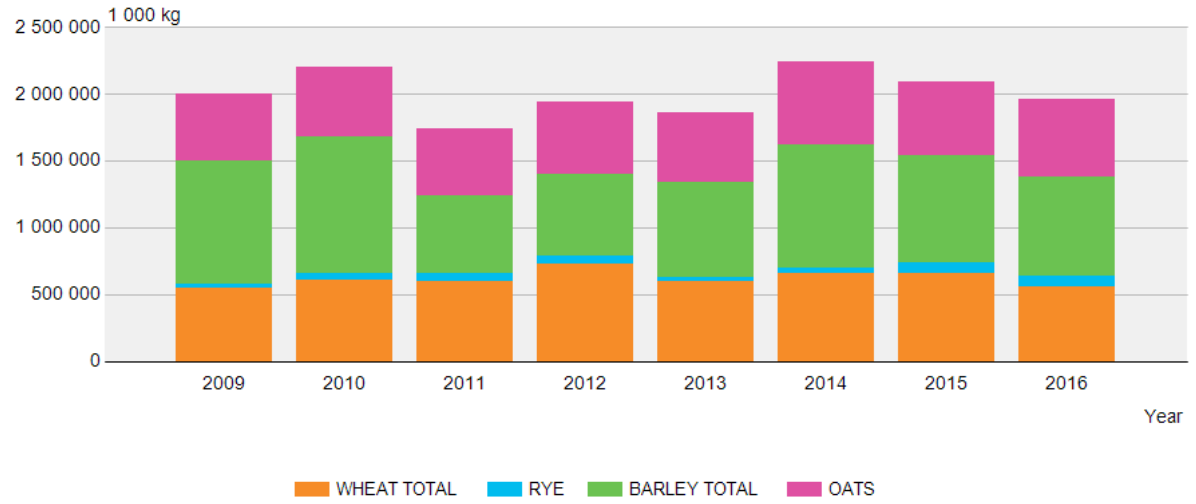
The Finnish industry consumed 1.4 billion kilograms of cereals. Almost half of the amount (650 million kilograms) was used to produce animal feed, one third (430 million kilograms) to produce food, and the remaining 310 million kilograms to make other industrial products. Other uses include, for example, malting and the production of ethanol, starch, glue powder, and enzymes.

The cereal that the industrial sector consumed the most was barley with 550 million kilograms, of which two fifths were used to produce industrial animal feed. A small percentage of barley, 14 million kilograms, was consumed by the food processing industry. Other industrial uses of barley, including malting, amounted to a total of 300 million kilograms.

A total of 250 million kilograms of wheat was used for food production (mainly bread milling) and 210 million kilograms for the production of animal feed, making the total 460 million kilograms. The use of wheat as animal feed decreased slightly on the previous year.

Cereals purchased from farms by industry and trade

▶ Background data as a table



The feed industry consumed more oat than during the previous year: 210 million kilograms. A total of 75 million kilograms of oat was turned into food products, which was slightly less than during the previous year. The total amount of oat used to produce animal feed and food came to just over 280 million kilograms, which was five per cent more than during the previous year.

Rye is a traditional bread cereal in Finland. The food processing industry consumed 91 million kilograms of rye, which was four million kilograms more than during the previous year.

Cereal stocks

At the end of 2015, industrial and commercial stocks of cereals amounted to 590 million kilograms, which was 10 per cent more than at the end of the previous year. The most abundant cereal in stock was wheat with almost 200 million kilograms, which was one third more than a year earlier. Rye stocks had also grown to 80 million kilograms. Oat stocks amounted to 150 million kilograms and barley stocks to 160 million kilograms. The total turnip rape and oilseed rape stocks stood at a record-breaking almost 23 million kilograms at the end of the year.

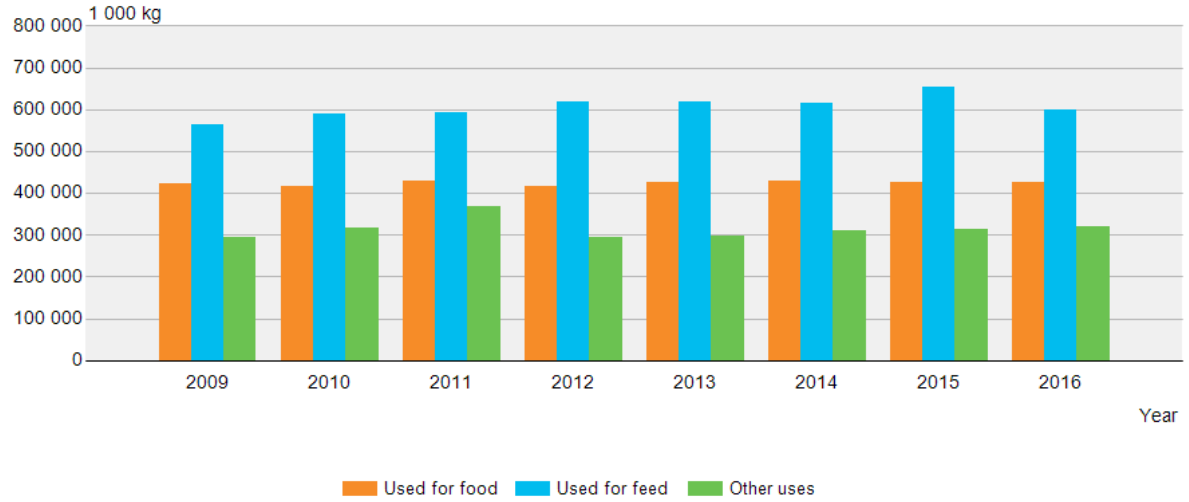
▶ Statistics on cereals purchased, used and stockpiled by industry and trade

Use of crops on farms and the cereals balance sheet

The 2015 cereal harvest was the lowest in three years with 3.7 billion kilograms. With an annual consumption

Cereals used by industry

▶ Background data as a table



Cereal stockpiled by industry and trade at the end of the year

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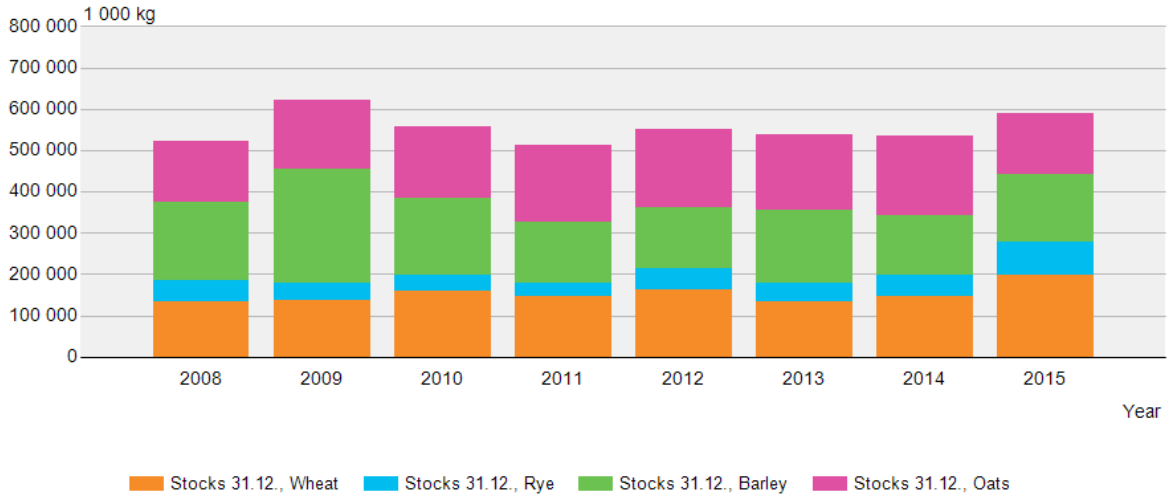


rate of three billion, however, the harvest was still high enough to leave 660 million kilograms for the export market. Rye is the only cereal that has been imported to Finland in significant quantities in recent decades, as Finnish rye production rarely satisfies domestic demand. The year 2015 was an exception: The rye harvest amounted to 108 million kilograms, which was enough to satisfy domestic demand for the first time in 15 years.

Farms sold two billion kilograms of the total cereal harvest of 3.7 billion kilograms. Approximately 600 million kilograms of the amount returned to the farms as commercial animal feed. All in all, farms therefore consumed 2.3 billion kilograms of the total harvest. The rest of the cereal harvest – approximately 1.4 billion kilograms – was sold to the Finnish food and drink industry and to the export market.

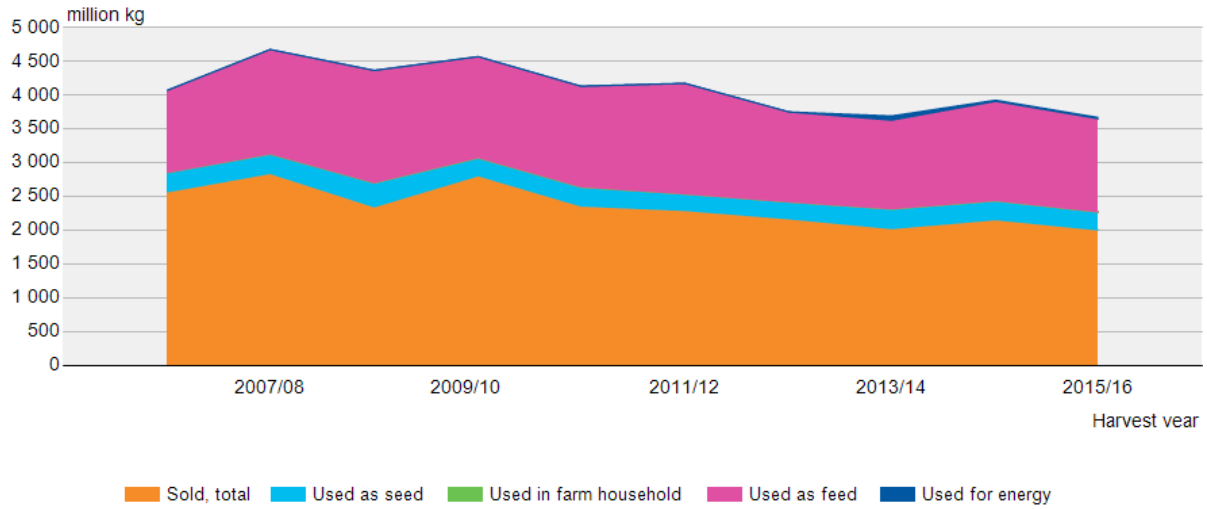
▶ Use of crops on farms

▶ Cereals balance sheet

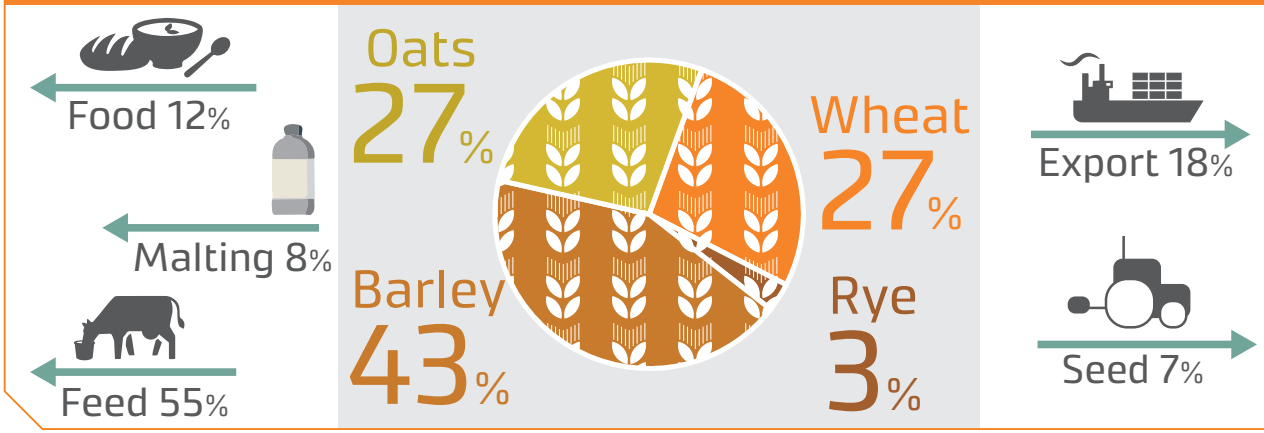
Photo: Erkki Oksanen / Luke

Use of grain on farms

▶ Background data as a table



2015 cereal harvest and its use



Producer prices for agricultural products

In 2015, the producer prices for milk and meat decreased compared to the previous year. The declining producer price for cereals stabilised, and the producer prices for eggs and potato increased.

Producer price for milk decreased

In 2015, producers were paid an average of 38.71 cents per litre for milk, which was 15 per cent less than during the previous year. The figure factors in not just the milk account price but also the annual adjustment payment.

The producer price for milk increased between 2009 and 2013 but took a downward turn around the middle of 2014 due to weaker export markets. Dairy producers also received a smaller adjustment payment in 2014 and 2015.

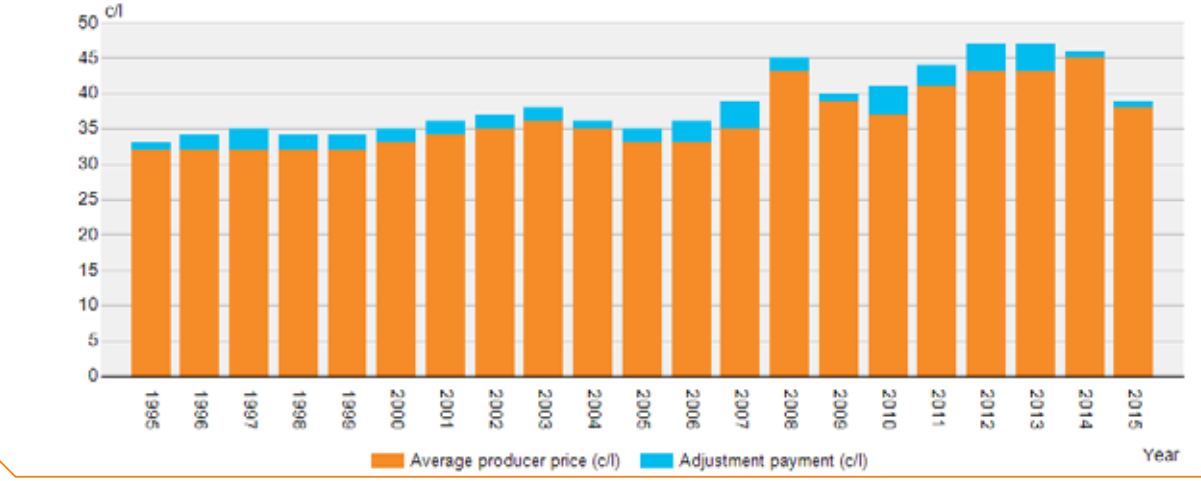
Producer prices for meat fell

The average producer prices for all kinds of meat have increased relatively steadily since 2010, but prices began to fall in 2014 with the exception of lamb. The price of lamb also took a downward turn in 2015.

The average producer price for pork, which makes up half of all meat production, was EUR 1.46 per kilogram in 2015 on average, which was eight per cent less than during the previous year. The average producer price for beef was EUR 2.90 per kilogram, which was four per cent less than during the previous year. Producers were paid an average

Annual milk producer prices

▶ Background data as a table



Annual meat producer prices

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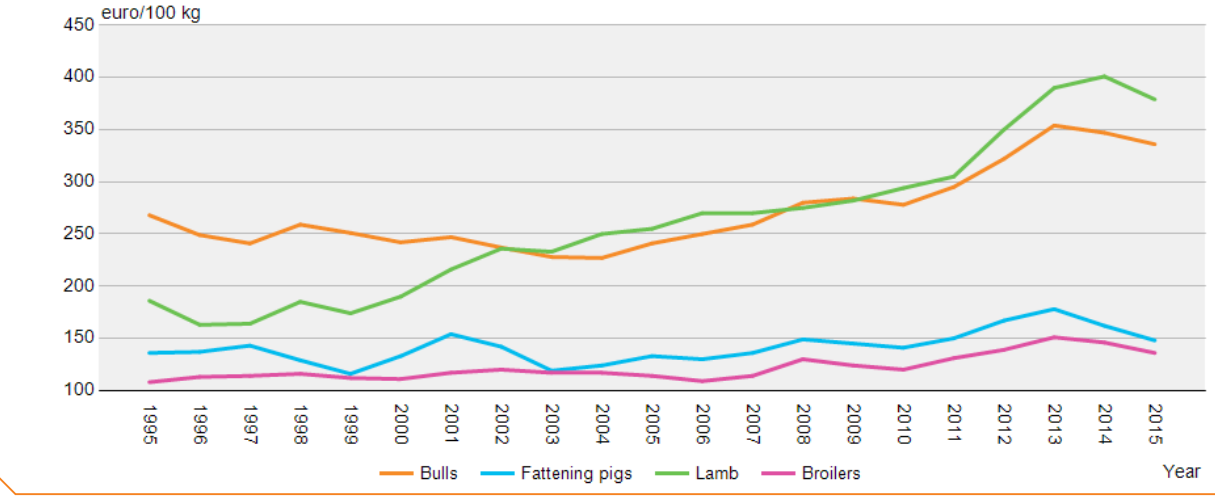


of EUR 1.39 per kilogram for poultry meat, which was six per cent less than during the previous year. The average producer price for lamb was EUR 3.19 per kilogram, which was eight per cent less than during the previous year.

Producer prices for eggs increased

The average price paid to producers for eggs in 2015 (average for class A and B) was EUR 1.00 per kilogram, which was two per cent more than during the previous year.

In terms of different production methods, barn eggs (including free-range eggs) fetched EUR 1.08 per kilogram, which was more than the EUR 0.96 per kilogram paid for enriched cage eggs. The average price paid for organic eggs was EUR 2.56 per kilogram, which was four per cent more than during the previous year.

Producer prices for cereals remained largely unchanged

The average basic price paid to farmers for bread wheat in 2015 was similar to that of the previous year at EUR 167 per tonne. The price of rye continued to drop for the second year in a row. The average basic price of rye in 2015 was EUR 175 per tonne, which was 11 per cent less than during the previous year.

The average basic price paid to producers for feed barley was EUR 137 per tonne, which was three per cent more than during the previous year. The average price paid for malting barley was EUR 159 per tonne, similarly to the previous year. The average basic price of oat was

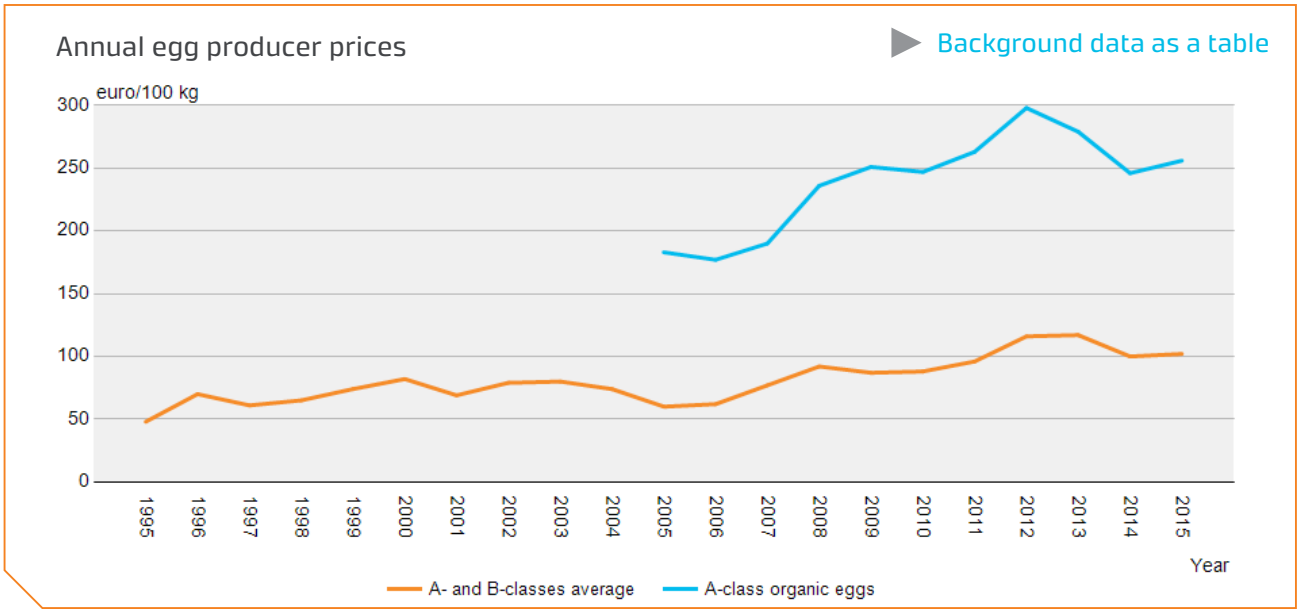
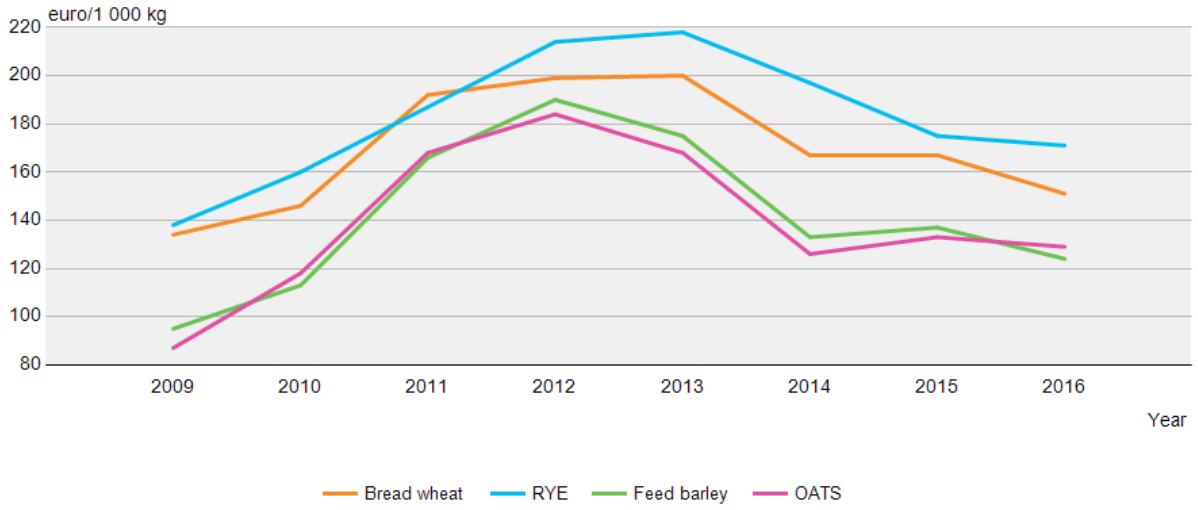


Photo: Erkki Oksanen / Luke

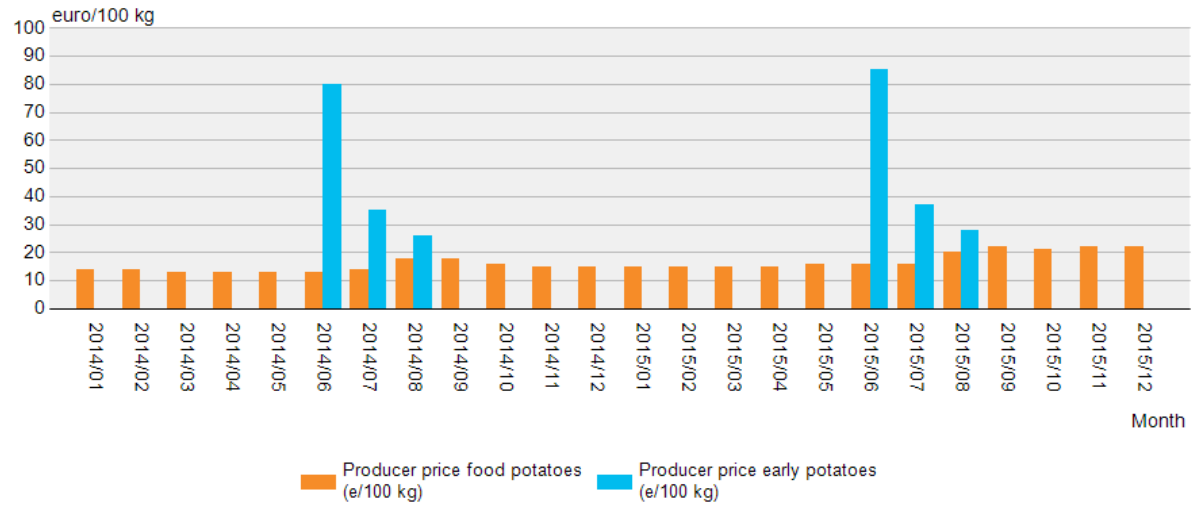
Annual cereal producer prices

Background data as a table



Monthly food potato producer prices

Background data as a table



EUR 133 per tonne, which was five per cent more than during the previous year.

The average basic price of turnip rape and rape was EUR 356 per tonne in 2015, which was slightly less than during the previous year.

Producer prices for potato slightly higher

The average price paid to producers for food potatoes in 2015 was EUR 0.18 per kilogram, which was slightly more than during the previous year. The average price paid for early potatoes was similar to the previous year at EUR 0.46 per kilogram.

Producer prices are based on surveys

The producer price is the price paid to a farmer for an agricultural product excluding value-added tax. Information on producer prices is based on questionnaires sent to first-hand buyers, such as dairies, slaughterhouses, agricultural trade, industries that use cereals, and egg and potato packaging plants. The information is collected monthly, and it can be found on the statistics page.

Producer prices of agricultural products

Profitability of agriculture

Luke's accounting system is used to monitor the economic development and profitability of Finnish agricultural and horticultural enterprises on the basis of accounting data collected annually from 900 businesses.

Businesses operated at a loss

The gross revenue, i.e. the sum of agricultural production and subsidies, amounted to approximately EUR 160,000 per farm in 2014. However, agricultural production costs averaged EUR 188,600, which resulted in a loss of EUR 28,200 per farmer. The costs include family businesses' labour costs, which were calculated on the basis of an hourly rate of EUR 15.1, and interest on capital at 4.7 per cent. Excluding these costs, the farm net income was EUR 16,900.

Profitability ratio lowest since 2009

The profitability ratio, which is a farm net income divided by the sum of labour and capital costs, was 0.37 on average. Farmers achieved 37 per cent of the labour cost and interest targets, i.e. an hourly rate of EUR 5.7 for labour and 1.7 per cent interest on capital. The average return on total assets was negative by two per cent.

The average size and total revenue of agricultural and horticultural enterprises have grown year after year. Despite the economies of scale resulting from larger farm sizes, profitability has nevertheless been on the decline for the whole of the 21st century.

Differences between production lines

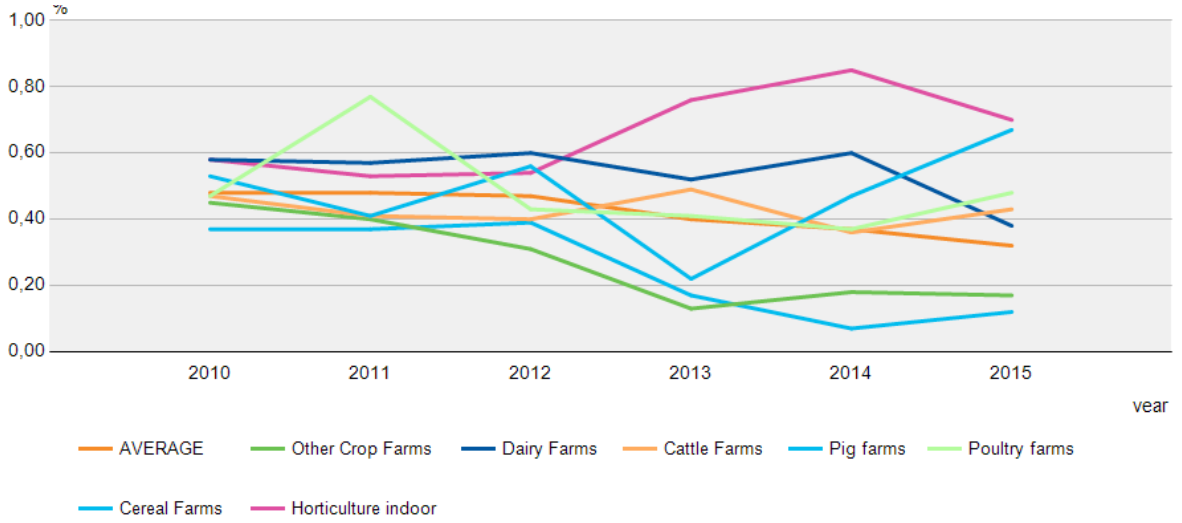
More than 60 per cent of Finland's agricultural income is attributable to milk. The profitability ratio of milk farms has varied between 0.50 and 0.60 in recent years, amounting to approximately 0.6 in 2014. The average income per farm has been approximately EUR 45,000.

The profitability of pig farms has dropped in recent years and varied between 0.2 and 0.6. The profitability ratio was 0.47 in 2014, and farm net income was approximately EUR 34,500.

The profitability of cereal farms as well as other plant production farms has plummeted. The profitability ratios fell to 0.07 and 0.18 respectively in 2014. The farmers focusing on these production lines had average annual incomes of just EUR 1,900 and EUR 3,850 respectively.

Profitability ratio by production type

Background data as a table



Lowest profitability figures in Southern Finland

Profitability has been above average in the northern areas C2, C2p, and C3, which are strong dairy and beef cattle regions. The poor profitability of plant production makes the A and B subsidy areas, i.e. Southern Finland, fare the worst. The differences in profitability are mostly due to the different production structures of different regions.

Best-performing farms remain competitive

The profitability ratio for the best quarter was 0.76, and farm net income was EUR 41,300. The profitability ratio of the 'weak' group was negative at -0.29, and farmers consequently also made a loss of EUR 11,300 on average. In other words, these farmers received no return on their labour and capital. Differences in profitability are vast even between farms of the same production line and of similar sizes.

Solvency at a healthy level

Despite the poor profitability, solvency within the sector has remained at a typically healthy level. Farms' capital has more than doubled since 2000, and it now amounts to EUR 470,000. Farmers' equity has risen to EUR 345,000, and it accounted for 74 per cent of total capital on average in 2014. The percentage was the highest on cereal farms and the lowest in greenhouses and on poultry farms.

The debt-to-turnover ratio, i.e. relative indebtedness, has nevertheless increased from the 60 per cent that it was at the beginning of the 21st century to almost 90 per cent due to the slow growth of turnover and the faster increase in debt. Low interest rates have made interest costs easier to manage, but, on the other hand, the highest debt rates are often found among newly established young farmers with high investment needs.

More comprehensive information available on the EconomyDoctor website

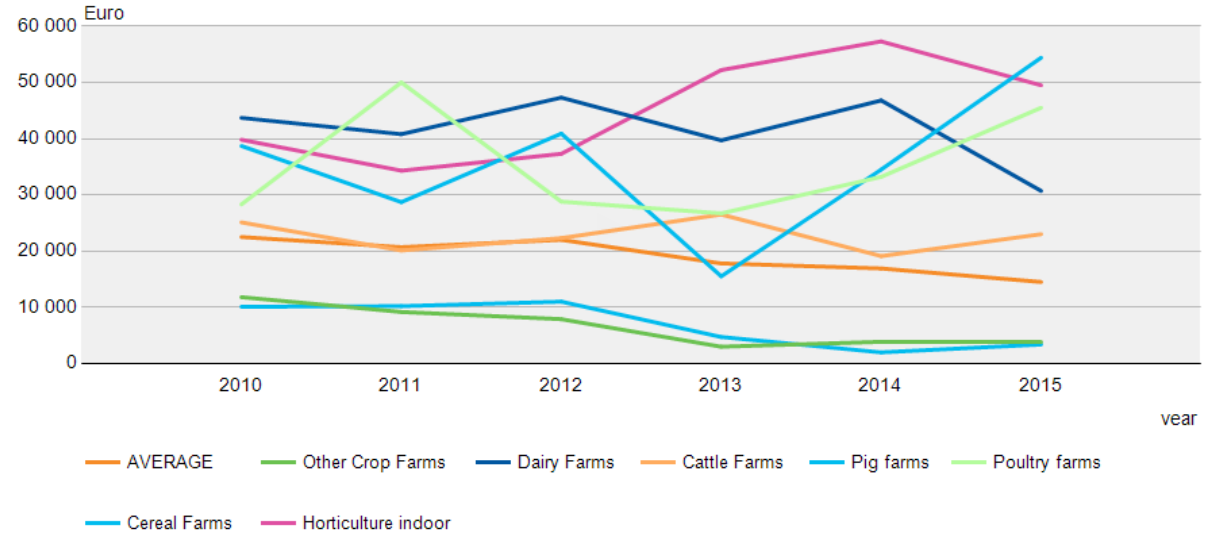
The findings are presented as weighted, and they represent the average figures of the 37,000 largest farms in Finland, which account for 95 per cent of Finland's agricultural production. Luke's profitability accounting data since the 2000 financial year are shown in more detail on the agriculture and horticulture pages of the EconomyDoctor website, along with forecasts for the 2015 and 2016 financial years.

▶ Profitability of agriculture

▶ EconomyDoctor

Farm net income by production type

▶ Background data as a table



Balance sheet for food commodities

Statistics on food consumption have been compiled with the help of the balance sheet for food commodities for more than 60 years. Cereal consumption has dropped by one third from the initial 120 kilograms, and meat consumption has increased from 30 kilograms to almost 80 kilograms per capita. Only one third of the amount of milk consumed in the early years of the 1950s is consumed now: approximately 125 litres. Potato consumption has dropped to nearly one third of the volume consumed 60 years ago.

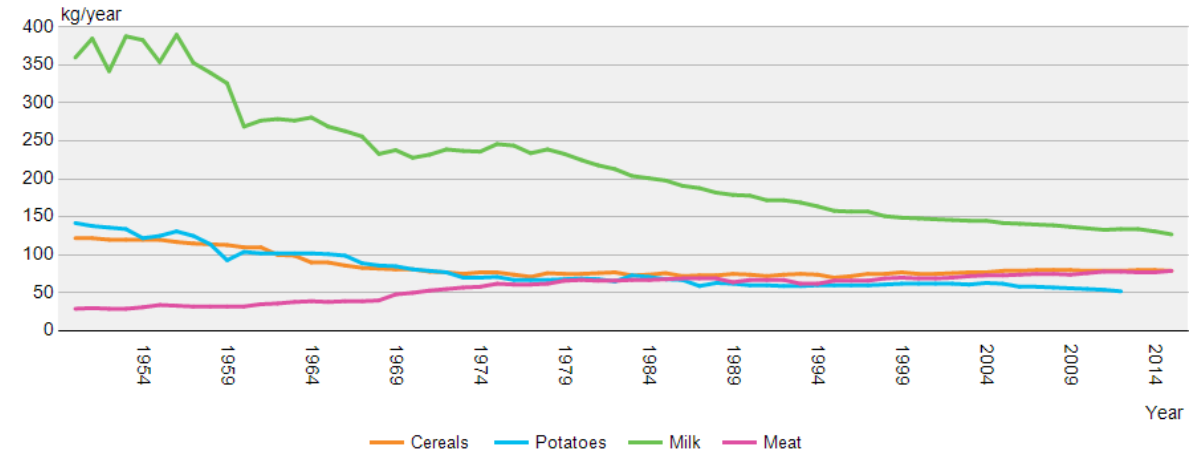
Cereal consumption at approximately 80 kilograms

The total consumption of cereals has remained at between 79 and 80 kilograms per capita in the last 10 years. The most consumed cereal is wheat with approximately 44 kilograms per capita in 2015. The figure fell by just under two kilograms on the previous year. Wheat consumption has remained relatively consistently at approximately 46 kilograms for the previous five years. Rye accounts for approximately one fifth of all cereal consumption. Rye consumption increased by approximately half a kilogram to just under 16 kilograms in 2015, after a drop during the previous year. Oat consumption amounted to approximately six kilograms and rice consumption to approximately five kilograms.

▶ Balance sheet for food commodities

Cereal, potato, milk, and meat consumption per capita, 1950–2015

▶ Background data as a table



Meat and egg consumption increased

Total meat consumption per capita increased by approximately three per cent on the previous year and amounted to just over 79 kilograms (including bones), when game and offal are also taken into account. The biggest increase was recorded in the consumption of poultry meat. Seven per cent more poultry meat was consumed in 2015 than during the previous year. Beef consumption grew by just under three per cent and pork consumption by just under two per cent. A total of 35 kilograms of pork, just under 22 kilograms of poultry meat, and 19 kilograms of beef were consumed per capita in 2015. Lamb consumption amounted to 0.7 kilograms, reindeer meat consumption to 0.5 kilograms, and horse meat consumption to 0.4 kilograms.

Eggs continued to increase in popularity. Egg consumption amounted to more than 11 kilograms per capita in 2015, which was approximately six per cent more than during the previous year and the highest figure in approximately 20 years.

Milk consumption fell, cheese consumption grew

Liquid milk products consumption amounted to a total of 174 kilograms in 2015, which was just under three per

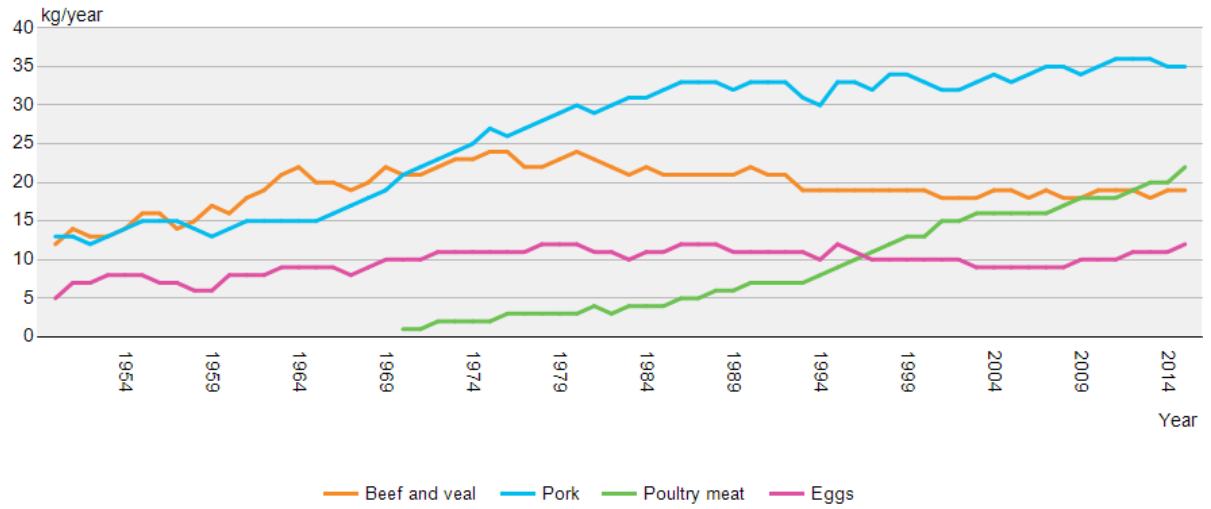
cent less than during the previous year. Milk consumption fell by three per cent on the previous year to a total of 123 litres per capita. It appears that the increase in whole milk consumption has been reversed, as there was a drop of nearly seven per cent. The decrease in the consumption of skimmed milk continued for the second year in a row. Low-fat milk consumption was at almost the same level as in 2014. Low-fat milk accounts for just over half, skimmed milk for just under 40 per cent, and whole milk for just under 10 per cent of all milk consumption. The decrease in sour milk and viili consumption continued, while yoghurt consumption remained unchanged. The increase in cheese consumption continued, and almost 27 kilograms of cheese was consumed per capita in 2015. More than half of all cheese was imported.

Photo: Luke's photo archive

The average consumption of liquid dairy products, 2015

Meat and egg consumption per capita, 1950–2015

▶ Background data as a table



Forest statistics

Photo: Erkki Oksanen / Luke

Forest statistics for 2015

Silvicultural quality of forests, forest damage, and deadwood volumes almost unchanged based on the 11th National Forest Inventory

Wood is produced across 18.4 million hectares (91%) of Finland's forests. Of these forests, 74 per cent have a good or at least satisfactory silvicultural quality. Seedling stands in urgent need of tending and stands where first thinning should have already been carried out amount to more than 1.5 million hectares. Damage that lowers the quality of the growing stock is found across 4.5 million hectares, which accounts for 25 per cent of the total area of forests used for wood production. Deadwood amounts to approximately 5.7 cubic metres per hectare. The total volume of growing stock stands at 2,356 million cubic metres, and the annual increment amounts to 105.5 million cubic metres. New statistics on the volume of growing stock and the rate of growth will be compiled in 2017.

Forest protection

Finland has a total of 2.7 million hectares of protected forest land and poorly productive forest land (12.0 per cent of the total area of forest land and poorly productive forest land). Forest land account for 1.6 million hectares of this figure (7.7 per cent of the total area of forest land). Protected areas consist of statutory protected areas and biodiversity conservation sites in commercial forests. The statistical principles and classifications used in forest protection statistics are based on a report published by a working group on statistics related to forest protection areas and the Forest Biodiversity Programme METSO. In order to increase international comparability of the statistics, previous classifications have been revised and some categories have been renamed. The definition of 'forest' used in the statistics is based on the combined area of forest land and poorly productive forest land according to the working group's report and established practice.

Artificial regeneration were used on 103,000 hectares

Three quarters of the forests regenerated with artificial regeneration was planted and one quarter was grown from seed. Almost all the planting was done manually, but only one fifth of seeding was carried out by hand. The most common site preparation technique used in artificial regeneration was mounding, which was used across 63 per cent of the total prepared area. Works relating to early pre-commercial or pre-commercial thinnings were carried out across 140,000 hectares.

Wood trade volumes fell

In real prices, the stumpage price of roundwood purchased by the forest industry from non-industrial forests increased slightly in 2015 compared to the previous year. The price of energywood fell in standing sales and increased in delivery sales. Based on the volumes recorded in timber sales agreements, the volume of roundwood purchased from non-industrial forests decreased by three per cent and energywood sales by 11 per cent from the previous year.

http://stat.luke.fi/en

Record-high removals and drain

A total of 58.5 million cubic metres of roundwood was harvested for use by the forest industries, which was five per cent more than during the previous year and almost one million cubic metres more than the previous removal record in 2007. Private forests supplied 82 per cent of all the industrial roundwood removal in 2015. Slightly more roundwood was also harvested for use as energy, which raised the total roundwood removals and the total drain to an all-time high.

Removals increased – stumpage earnings amounted to EUR 2 billion

The gross stumpage earnings of forest owners amounted to EUR 2 billion in 2015. Forest owners' income increased by five per cent in real terms and amounted to two per cent more than the average of the previous 10 years. The earnings of private forest owners totalled EUR 1.7 billion (+6%) and those of the state EUR 0.29 billion (-1%). Logs accounted for approximately 70 per cent of the total income.

Consumption of domestic roundwood on the rise - energy use of forest chips decreasing

Roundwood consumption amounted to 74.3 million cubic metres in 2015, of which 64.7 million cubic metres was used to manufacture forest industry products. A total of 9.6 million cubic metres of roundwood was burnt in energy generation. The 56.1 million cubic metres of domestic roundwood used by the forest industries was the highest amount in the last eight years. Almost half of all industrial roundwood was consumed by the chemical pulp industry. Production volumes and especially investments reflected the rising trend in the forest industries. Chemical pulp production increased by two per cent and paperboard production by four per cent on the previous year. Forest industries' investments (EUR 0.95 billion) grew by 83 per cent in real terms compared to the year 2014. The consumption of forest chips in heating and power plants continued to decrease for the second year in a row and amounted to 7.3 million cubic metres.

Forest industry products' contribution to Finnish goods exports increased

The value of forest industry products exported by Finland in 2015 amounted to EUR 11.6 billion, and they accounted for 22 per cent of all Finnish goods exports. Two thirds of the total value of forest industry product exports, were sold to Europe. The importance of Asia as an export destination has been increasing (share of 18%). Finland imported 9.6 million cubic metres of wood, mostly pulpwood and wood chips. The volume of wood imports decreased six per cent from the previous year.

Private forest owners made a profit of EUR 114 per hectare

Based on provisional figures, the per-hectare profit amounted to EUR 114 in 2015. The increase on the previous year amounted to 8 per cent in real terms, and the change was consistent with the average of the previous 10 years. Based on provisional data, the return on assets on wood production was 2.5 per cent in real terms. The figure was 0.2 percentage points up on the previous year, but 1.3 percentage points down on the average of the previous 10 years.

Forest resources

Forest resources – a review of the status of forests

Statistics on forest resources are based on the National Forest Inventories (NFI) of the Natural Resources Institute of Finland, the first of which was carried out in the 1920s. The inventories gather information on the area of forest, the amount of growing stock, and growth rate, and in recent decades also increasingly on the silvicultural quality and biodiversity of forests. The latest data are based on the 11th National Forest Inventory (NFI11), which was carried out between 2009 and 2013.

Silvicultural quality of forests

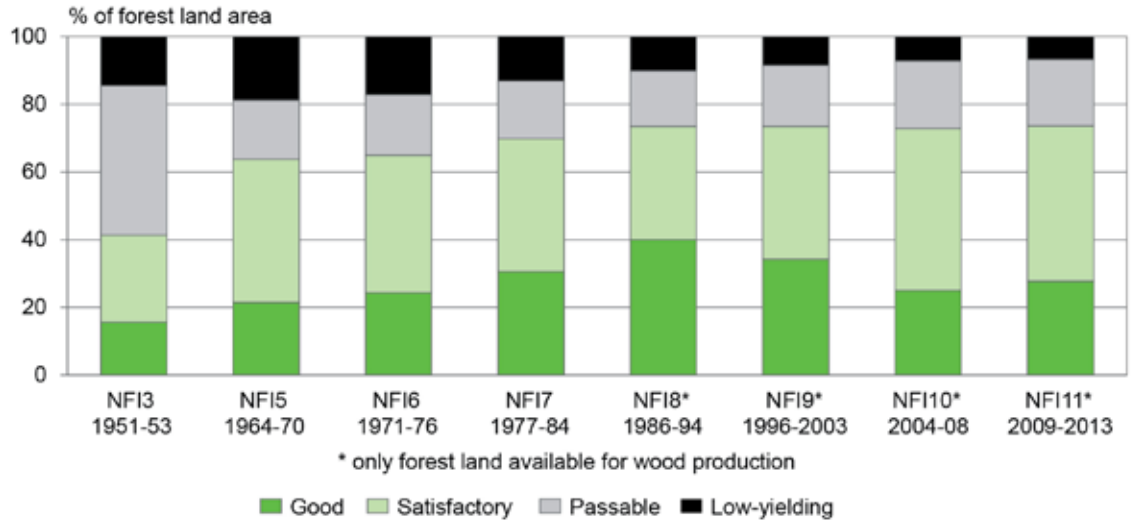
At the beginning of the 1950s only just over 40 per cent of Finnish forests were estimated to have a good or satisfactory status due to a long tradition of using forests in a manner that lowers their silvicultural quality. The growth rate of trees was far behind the potential, and removals and other drain even exceeded growth in some years. A goal was set to increase the growth rate considerably by investing more in silviculture and the improvement of forests. This involved stopping the selective cuttings and promoting the regeneration of underproductive forests.

Thanks to these measures, the status of forests improved from the 1950s to the 1980s. Since then, forests that have a good or at least satisfactory status have accounted for nearly 75 per cent of all forests available for wood supply, although the percentage of forests that have a good status has dropped more recently. The increment of growing stock took a clear upward turn in the 1970s and is now almost double the increment of growing stocks of the 1950s.

- Forest resources (NFI's home page)
- Forest resources (Luke's statistical services)

Based on the NFI11, low-yielding forests, i.e. forests in need of urgent regeneration due to poor productivity, account for seven per cent of all forests that are forests available for wood supply and amount to 1.3 million hectares in total. The most common reasons for low-yielding include the predominance of species that have little value in terms of wood production, sparseness resulting from causes other than felling, and various kinds of forest damage. In addition to more efficient silviculture, the percentage of underproductive forests available for wood supply has also, since the 1950s, decreased as a re-

Silvicultural quality, 1951–2013



sult of the designation of old – and therefore often unproductive – forests as conservation areas. Based on the NFI11, area of forests available for wood supply amount 18.4 million hectares, or 91 per cent, of the total area of 20.3 million hectares of forests.

The silvicultural quality of forests depends on the success of forest regeneration and timely silvicultural works in seedling stands and young forests. Works relating to tending seedling stands and improvement of young stands peaked towards the end of the 1970s, when they amounted to more than 500,000 hectares per year. The volumes fell in subsequent decades, and, despite having grown again in the 21st century, the NFI11 indicates that many seedling stands and young forests have been neglected to a point where the yield of the growing stock has suffered. There are 750,000 hectares of seedling stands in urgent need of tending and 810,000 hectares of young forests in need of thinning. According to the latest NFI, just 35 per cent of seedling stands have a good status and 75 per cent have a good or satisfactory status. Only 20 per cent of young forests have a good status, although forests with a good or satisfactory status amount to 71 per cent altogether.

Forest damage

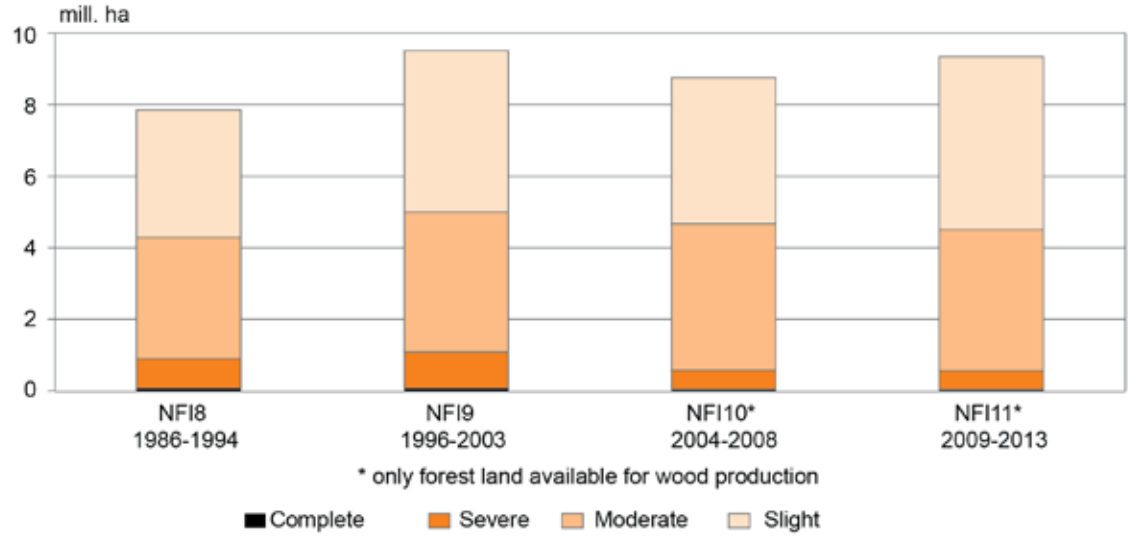
Due to forest dieback in Central Europe and *Gremmeniella abietina* findings in Finland, considerably more comprehensive reporting of forest damage was introduced in connection with National Forest Inventories in the 1980s. Damage that lowers the quality of the growing stock – moderate or severe damage, or total destruction – was found across 4.3 million hectares at that time and across 4.5 million hectares in the latest inventory. Slight damage was observed across 4.8 million hectares, which means that approximately half of all forests available for wood supply have suffered some degree of damage.

The scale of fungal damage that lowers the quality of the growing stock has decreased from the 1.4 million hectares of the 1980s and 1990s to the 690,000 hectares reported in connection with the NFI11. The scale of damage caused by elk has increased from 230,000 hectares to 520,000 hectares during the same period. The most common causes of damage are various abiotic factors, such as snow and wind. The species causing the most fungal damage is *Cronartium flaccidum*. In many cases, the cause of the damage cannot be identified retrospectively. This kind of damage is evidenced, for example, by bends in tree trunks and other deformations that date back a long time.

Volume of deadwood

Monitoring the among of dead wood was started in NFIs in the 1990s, when measures aimed at preserving and increasing biodiversity in forests were incorporated into the new Forest Act and new silvicultural recommendations. Until that time, only hard deadwood, solid enough to be used as firewood, was assessed. The NFI now takes

Damaged area by degree of damage, 1986–2013



into account all deadwood with a diameter of at least 10 centimetres.

Based on the latest inventory (NFI11), deadwood in forest and scrub land amounts to a total of 126 million cubic metres. The average volume of deadwood in forests across the country is 5.7 cubic metres per hectare. Deadwood amounts to 3.8 cubic metres per hectare in the forests of Southern Finland and to 8.0 cubic metres per hectare in Northern Finland. Even though felling is rare in scrub land, the volume of deadwood is lower in scrub land than in forests on average. The volume of deadwood has increased slightly in Southern Finland and decreased in Northern Finland in recent years. The highest volumes of deadwood are found in old forests that are mature for regeneration, and the lowest volumes are found in young forests. Based on the NFI11, deadwood that is solid enough to be used as firewood amounts to 59 million cubic metres. The amount is almost double that of the figures reported in the 1960s and 1970s, when it was at its lowest, and also higher than the figures recorded in connection with the NFI2 towards the end of the 1930s.

Average volume of deadwood on forest land in 1996–2013

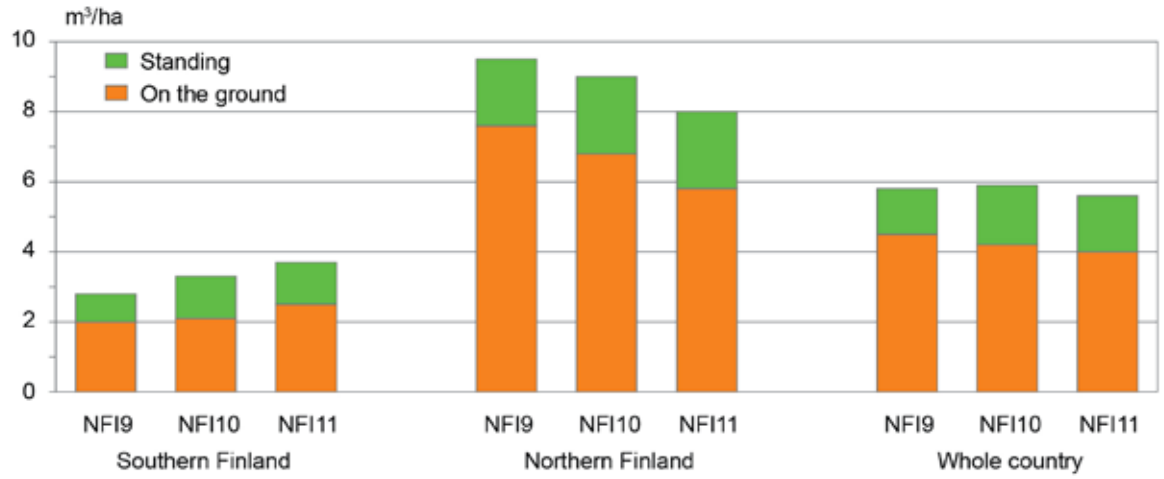


Photo: Erkki Oksanen / Luke

Forest protection

Finland has a total of 2.7 million hectares of protected forest land and poorly productive forest land (12.0 per cent of the total area of forest land and poorly productive forest land). Forest land accounts for 1.6 million hectares of this figure (7.7 per cent of the total forest land area). Protected areas consist of statutory protected areas and biodiversity conservation sites in commercial forests.

Statistical principles are based on a report by a specialist working group

The statistical principles and classifications used in forest protection statistics are based on a report published by a working group on statistics related to forest protection areas and the Forest Biodiversity Programme METSO (Ministry of Agriculture and Forestry, 2015:2). The classifications are based on a classification system developed by a working group for the harmonisation of forest protection classification and statistics in 2002 and the definition of 'protected area' adopted by the International Union for Conservation of Nature (IUCN) in 2008. In order to increase international comparability of the statistics previous classifications have been revised and some categories have been renamed. The definition of 'forest' used in the statistics is based on the combined area of forest land and poorly productive forest land according to the working group's report and established practice. The statistics are based on the situation at the beginning of 2016 and consist of three main categories: 1 Statutory protected areas, 2 Biodiversity conservation sites in commercial forests, and 3 Areas supporting conservation of nature values. The statistics also cover water bodies.

Statutory protected areas

Statutory protected areas (Category 1) encompass a total of 2.4 million hectares of forest land and poorly productive forest land, of which 1.3 million hectares is forest land. Statutory protected areas cover 10.6 per cent of the total area of forest land and poorly productive forest land in Finland and 6.6 per cent of the area of forest land.

The most strictly protected areas (Category 1A) include, among others, national parks and strict nature reserves, as well as private nature reserves and areas governed by nature conservation programmes. Other statutory protected areas include Category 1B (no felling) areas, such as wilderness reserves and protected forests of Metsähallitus (public administration duties), and Category 1B (cautious felling possible) areas, such as Natura 2000 sites or parts of those sites that are protected under provisions other than those of the Nature Conservation Act or the Wilderness Act, as well as areas set aside for the protection of habitats of special importance on private land pursuant to the Forest Act. Fixed-term protection areas (Category 1C) include fixed-term nature reserves pursuant to the Nature Conservation Act and areas subject to environmental forestry subsidy agreements pursuant to the Act on the Financing of Sustainable Forestry.

Biodiversity conservation sites in commercial forests

Biodiversity conservation sites in commercial forests (Category 2) are found across 0.3 million hectares of forest land and poorly productive forest land, which equates to 1.5 per cent of the total area of forest land and poorly productive forest land. Forest land account for 0.2 million hectares of this, which is 1.1 per cent of the total area of forest land. Category 2 areas consist of areas designated

Photo: Reijo Penttilä / Luke

for the preservation of biodiversity in the GIS registers of the Finnish Forest Centre and Metsähallitus Metsätalous Oy. In some of these biodiversity conservation sites in commercial forests selection cutting for nature management purposes or cuttings that does not compromise the objectives of nature conservation, may be allowed.

Areas supporting conservation of nature values

Areas supporting conservation of nature values (Category 3) include other special areas subject to forestry restrictions, such as forests designed for recreational use and special areas for reindeer husbandry and Sámi culture. Of these areas, forest land and poorly productive forest land accounts for a total of 0.4 million hectares, of which 0.3 million hectares is forest land. Areas supporting conservation of nature values are not considered protected areas in statistics.

Forest protection is concentrated in the north

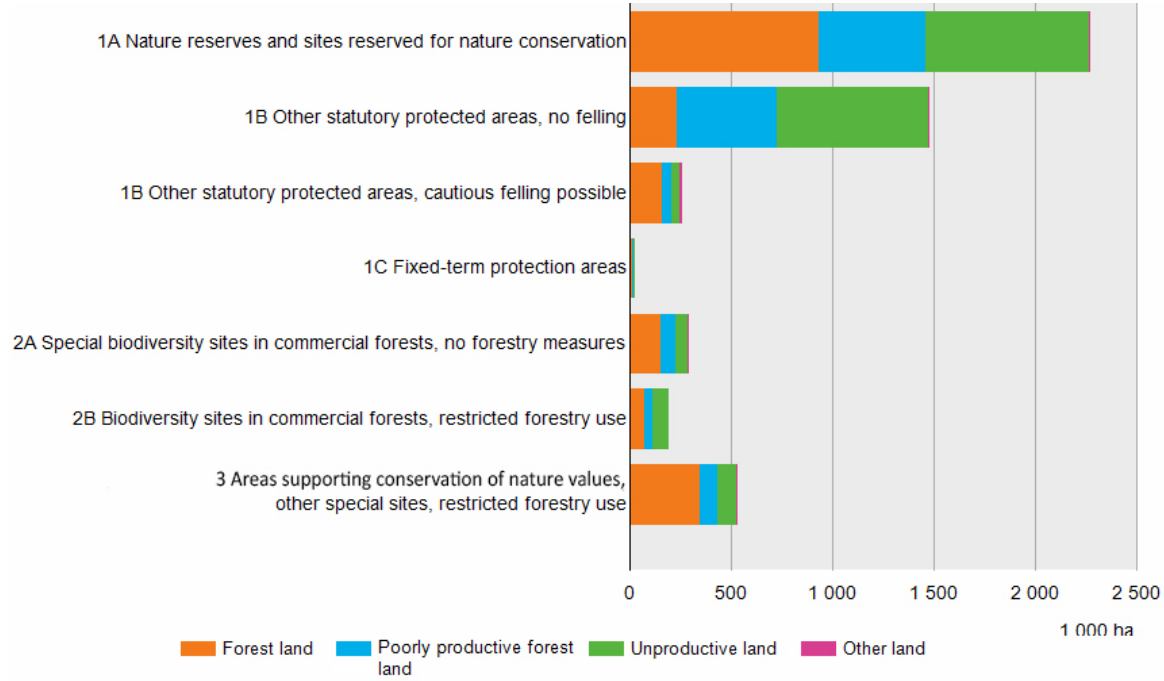
The majority of protected forest land and poorly productive forest land is located in Northern Finland (Northern Ostrobothnia, Kainuu, and Lapland), where protected areas amount to 2.2 million hectares, or 19.4 per cent of the total area of forest land and poorly productive forest land. Forest land account for 1.1 million hectares of this figure (12 per cent of the total area of forest land). Southern Finland has approximately 0.55 million hectares of protected forest land and poorly productive forest land, which accounts for 4.8 per cent of the total area of forest land and poorly productive forest land. Forest land account for 0.45 million hectares of this figure (4.1 per cent of the total area of forest land).

Majority of areas protected under the Nature Conservation Act and the Wilderness Act

The majority of Finland's protected forests are located in nature reserves established pursuant to the Nature Conservation Act and in areas designated as nature reserves under nature conservation programmes adopted by the Government, as well as in wilderness reserves based on the Wilderness Act. The most important means of preserving biodiversity laid down in the Forest Act is the protection of habitats of special importance. A total of 87 per cent of protected forest land and poorly productive forest land and a total of 83 per cent of protected forest land are located on state-owned land.

Protected areas, biodiversity conservation sites in commercial forests, and areas supporting conservation of nature values on 1st January 2016

Background data as a table



Protected areas and biodiversity conservation sites in commercial forests.

	ALL FINLAND				SOUTHERN FINLAND				NORTHERN FINLAND			
	Forest land		Forest land and poorly productive forest land, total		Forest land		Forest land and poorly productive forest land, total		Forest land		Forest land and poorly productive forest land, total	
	Area (1,000 ha)	%	Area (1,000 ha)	%	Area (1,000 ha)	%	Area (1,000 ha)	%	Area (1,000 ha)	%	Area (1,000 ha)	%
1A Nature reserves and sites reserved for nature conservation	934.2	4.6	1,455.5	6.4	250.8	2.3	300.4	2.6	683.4	7.5	1,155.1	10.3
1B Other statutory protected areas - no felling	230.8	1.1	723.9	3.2	28.2	0.3	32.6	0.3	202.6	2.2	691.3	6.1
1B Other statutory protected areas - cautious felling possible	156.8	0.8	206.2	0.9	109.7	1.0	124.9	1.1	47.1	0.5	81.3	0.7
1B Other statutory protected areas, total	387.6	1.9	930.1	4.1	137.9	1.2	157.4	1.4	249.7	2.7	772.7	6.9
1C Fixed-term protection areas	9.8	0.0	16.8	0.1	8.8	0.1	13.5	0.1	0.9	0.0	3.2	0.0
1A + 1B + 1C Statutory protected areas, total	**1,331.6**	**6.6**	**2,402.3**	**10.6**	**397.6**	**3.6**	**471.3**	**4.1**	**934.0**	**10.2**	**1,931.0**	**17.1**
2A Special biodiversity sites in commercial forests, no forestry measures	152.7	0.8	225.1	1.0	23.0	0.2	31.0	0.3	129.6	1.4	194.2	1.7
2B Biodiversity sites in commercial forests, restricted forestry use	68.8	0.3	109.8	0.5	34.1	0.3	46.9	0.4	34.7	0.4	62.9	0.6
2A + 2B Biodiversity conservation sites in commercial forests	**221.5**	**1.1**	**334.9**	**1.5**	**57.2**	**0.5**	**77.8**	**0.7**	**164.3**	**1.8**	**257.1**	**2.3**
1A + 1B + 1C + 2A + 2B Protected forests, total	**1,553.1**	**7.7**	**2,737.2**	**12.0**	**454.7**	**4.1**	**549.1**	**4.8**	**1,098.3**	**12.0**	**2,188.1**	**19.4**

Implementation of the METSO programme has increased the scope of protected areas

The area of protected areas has increased in recent years thanks to conservation measures implemented on state-owned and private land on the basis of the Forest Biodiversity Programme for Southern Finland METSO (2008–2025) as well as land use decisions made by Metsähallitus, such as those related to natural resources planning. New national parks established between 2008 and 2015 have increased the area of protected waters in particular.

Protected areas have increased by a total of approximately 56,000 hectares thanks to measures taken pursuant to the Nature Conservation Act as part of the METSO programme between 2008 and 2015. Approximately 43,000 hectares of the figure are attributable to land purchases and conservation decisions taken by Centres for Economic Development, Transport and the Environment as part of the programme, and 13,000 hectares of Metsähallitus' land has been protected by decisions of the Government. The Finnish Forest Centre has taken advantage of the Act on the Financing of Sustainable Forestry by imposing environmental forestry subsidy agreements on approximately 34,000 hectares of land and implemented nature management projects across approximately four thousand hectares of commercial forest. The aim of the METSO programme is to expand the network of nature conservation areas by a total of 96,000 hectares and in addition to that to preserve a total of 82 000 hectares of private land with significance in terms of biodiversity by means of environmental forestry subsidy agreements and nature management projects by 2025.

▶ Forest protection

Silviculture

The statistics on silvicultural and forest improvement works describe the amount of silvicultural and forest improvement works carried out in forests and the associated unit and total costs. The statistics cover a wide range of measures, of which only the most important will be discussed here. Silviculture refers to measures designed to improve the quality of the growing stock and ensure the regeneration, health, and growth of forests until the next felling. Forest improvement works typically involve far-reaching measures designed to promote the regeneration of forests, increasing wood production capacity by improving the growing conditions, and ensuring year-round harvesting and transportation of wood. The state contributes to the funding of forest improvement works according to the Act on the Financing of Sustainable Forestry.

Revisions to silvicultural classifications and data gathering

The statistical classifications of different types of works were revised as of the year 2015. The classification system was simplified, and developments in silvicultural techniques were taken into account. The new, simpler classification system meant dropping certain techniques (such as pruning) from the statistics and abolishing statistical subcategories (for example, the afforestation of arable land and the supplementary seeding and planting of seedling stands are now included in planting). Silvicultural works were divided into manual and mechanical works. The early pre-commercial thinning and pre-commercial thinning, for example, are now categorised as either manual labour or mechanical labour. Although the changes brought the classification of techniques up to date, they also make comparisons to earlier statistics more difficult. In addition to the classification of techniques, the regional division of data gathering also changed and is now based on administrative regions instead of the former Forest Centre districts.

Small forestry service providers were added as a new group of respondents to silvicultural surveys. The other target groups of surveys remained unchanged: forest management associations, providers of forest services of forestry companies, the state, etc.

Photo: Erkki Oksanen / Luke

The data on works carried out in private forests include an estimate of the silvicultural works carried out by forest owners themselves under the supervision of forest management associations. Contrary to previous years, works carried out by forest owners without supervision are not included in the statistics. This makes it more difficult to compare the figures against those of previous years, especially with regard to works that are often carried out without supervision.

103,000 hectares of land was used for artificial regeneration

Artificial regeneration was carried out across 103,000 hectares of land in 2015. A total of 76 per cent of the area was planted and 24 per cent was grown from seed. Approximately the same amount of land was used for artificial generation as during the previous year. A total of 72 per cent of the planted area (78,000 hectares) was planted with spruce and 22 per cent with pine. Other planted species, of which birch is the most important, accounted for six per cent. In forests that are grown from seed, the species is almost always pine.

Seeding can be divided into manual and mechanical forest cultivation. A total of 25,000 hectares of forest was grown from seed, and the majority of seeding, 81 per cent, was carried out with the help of machinery. Almost all planting is still done manually, and only two per cent of the 78,000 hectares of planted area was planted mechanically.

The soil is usually prepared for artificial regeneration to promote the growth of seedlings. Soil preparation was carried out across 104,000 hectares in 2015, which was six per cent less than during the previous year. The most common soil preparation technique was mounding, which accounted for 63 per cent of the total prepared area. Disc trenching accounted for 22 per cent, patch scarification for 10 per cent, and other soil preparation techniques (such as ploughing and ploughing of fields) for five per cent.

140,000 hectares of seedling stands were tended

Works relating to early pre-commercial thinnings and pre-commercial thinnings were carried out across a total of 140,000 hectares in 2015. Early pre-commercial thinning is carried out between four and six years after planting, and the pre-commercial thinning begins when the trees reach a height of between approximately three and eight metres. Early pre-commercial thinning involves removing ground vegetation and competing species of trees, while the pre-commercial thinning can also involve thinning of the seedlings themselves and removing some of the nurse crop. Both operations can be carried out either manually or mechanically, but mechanical techniques are not yet very widespread. Only three per cent of the total area was processed by machinery.

Works relating to the improvement of young stands were carried out across an area of 40,000 hectares. These works involve clearing and thinning young stands that have passed the seedling stage.

Volume and costs of silvicultural works

The table below shows the volumes and costs of the most important silvicultural works. A more detailed breakdown of costs can be found on the statistics website.

▶ Silvicultural and forest improvement work

Volume and costs of silvicultural works in 2015.

	Volume, 1,000 ha	Unit cost, EUR/ha	Total cost, EUR million
Clearing of regeneration areas	36	167	6.3
Initial clearing of intermediate felling areas	44	279	12.0
Soil preparation	104	327	33.4
Seeding	25	227	5.3
Planting	78	568	44.1
Early pre-commercial and pre-commercial thinnings	140	416	55.8
Improvement of young stands	40	433	16.7
Fertilisation	42	341	13.3

The silvicultural survey included separate questions for unit costs and total costs, which is why the volume of work multiplied by the unit cost does not necessarily add up to the total cost.

Wood trade

The statistics are based on wood purchased by the forest industry from non-industrial private forests. Two different wood trade methods are used by private forest owners. Standing sales involve the buyer felling and transporting the wood to a roadside storage, and the wood is charged according to stumpage prices. Delivery sales involve the forest owner felling the trees and transporting the wood to a location along a long-distance delivery route. The roadside price payable for the wood includes a charge for the harvesting involved.

Information about both roundwood and energywood trade

The Natural Resources Institute Finland compiles statistics on both roundwood and energywood trade. The main focus in the statistics is on the prices of wood, but they also contain information about the volume of wood purchased from non-industrial private forests. With regard to the quantitative figures, it is important to note that the statistics are based on timber sales agreements, which typically underestimate the volume of wood. The final volumes of purchased wood only become known when the trees are felled. The data collected for the statistics have also been expanded on two occasions. Some of the members of the Finnish Sawmills Association joined the process at the beginning of 2014. The 2015 statistics on roundwood trade covered approximately 90 per cent of all wood trade from non-industrial private forests.

Statistics have also been compiled on wood trade by forest management associations as of the beginning of 2016. However, the figures shown here do not yet take into account the latest expansion of the scope of the statistics. The wood volumes of the surveyed businesses are shown in the statistics without adjustments, which means that the expansion of data collection cause a jump in time series.

Photo: Erkki Oksanen / Luke

Stumpage prices by main wood product in 2015.

Product	Stumpage price	Increase/decrease in real terms	
		on the previous year, %	on the average of the previous 10 years
Pine logs	54.4	1.1	-5.1
Spruce logs	54.5	0.3	-6.7
Birch logs	42.0	3.2	-7.9
Pine pulpwood	15.6	1.5	-4.2
Spruce pulpwood	16.9	0.6	-20.9
Birch pulpwood	15.4	0.8	-2.4

Roadside prices by main wood product in 2015.

Product	Roadside price	Increase/decrease in real terms	
		on the previous year, %	on the average of the previous 10 years
Pine logs	56.6	1.3	-4.6
Spruce logs	55.1	-0.4	-6.4
Birch logs	46.6	2.9	-6.3
Pine pulpwood	27.7	-0.7	-9.7
Spruce pulpwood	29.5	1.2	-12.3
Birch pulpwood	29.3	0.5	-5.4

Roundwood trade covers all wood purchased from non-industrial private forests that is intended for making forest industry products. Energywood trade encompasses wood purchased for making forest chips, which can be used to fuel heat and power plants. Statistics on energywood trade has been compiled since 2014.

The prices of wood are given here in real terms (deflated using the wholesale price index. The prices given in the statistics database of the Natural Resources Institute Finland are nominal values. Cubic metre refers to a solid cubic metre over bark.

Stumpage prices of roundwood close to those of the previous year in real terms

In 2015, the stumpage prices of roundwood increased slightly on the previous year in real terms. The increase for logs was just under one per cent, and the increase for pulpwood was just over one per cent. Pine logs fetched EUR 54.4 and spruce logs EUR 54.5 per cubic metre in 2015.

Compared to the average of the previous 10 years, the stumpage prices of both logs and pulpwood had fallen. Based on this comparison, log prices had fallen by six per cent and pulpwood prices by 10 per cent. Compared to the previous 10 years, the price of spruce pulpwood had decreased the most in real terms: by one fifth. The next biggest relative changes were recorded for birch logs (-8%) and spruce logs (-7%).

The stumpage price of wood is largely dependent on the felling method. The stumpage price for logs harvested by regeneration felling was two per cent higher than the average stumpage price for logs, and the stumpage price for logs harvested by means of thinning was 14 per cent lower than the average stumpage price for logs in 2015. Pulpwood harvested by means of regeneration felling fetched 11 per cent more, pulpwood harvested by means of thinning fetched seven per cent less, and pulpwood harvested in the course of a first thinning fetched 28 per cent less than the average stumpage price paid for pulpwood.

The roadside prices of wood purchased from private forests remained similar level to the previous year in 2015. Compared to the average of the previous 10 years, roadside price level were nevertheless down by seven per cent. Most delivery sales involve pulpwood.

Wood trade volumes fell

A total of 32.9 million cubic metres of roundwood (measured over bark) was purchased from non-industrial private forests in 2015. Wood purchases decreased by three per cent on the previous year. The decrease was caused by a drop in log purchases, while the volume of pulpwood purchases remained unchanged. Wood trade volumes typically fluctuate considerably year on year.

The majority of stands marked for harvesting are sold by standing sales. Standing sales accounted for 83 per cent of wood trade from non-industrial private forests in 2015, which was a relatively typical figure. Slightly more logs than pulpwood has been sold by means of standing sales during the previous 10 years. A total of 27.2 million cubic metres of wood was sold by standing sales in 2015, of which 13.3 million cubic metres were logs and 13.0 million cubic metres was pulpwood.

The great majority of wood sold by standing sales originates from regeneration felling stands. Regeneration felling accounted for 68 per cent of all wood purchased by standing sales in 2015. Thinning accounted for 27 per cent and first thinning stands for four per cent.

The volume of wood procured by means of delivery sales was 5.4 million cubic metres. Compared to standing sales, delivery sales are clearly dominated by pulpwood. Pulpwood accounted for 4.2 million cubic metres of all delivery sales and logs for 1.2 million cubic metres.

Percentages of different felling techniques of the volume of roundwood sold by standing sales in 2015.

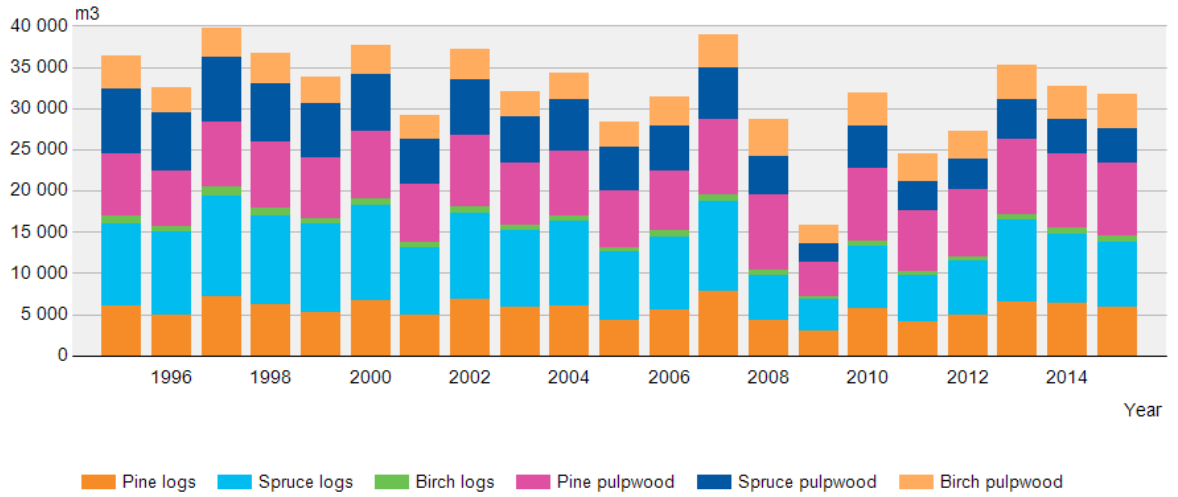
Product	Regeneration felling, %	Thinning and first thinning, %
Pine logs	81	18
Spruce logs	90	10
Birch logs	78	22
Pine pulpwood	43	57
Spruce pulpwood	66	34
Birch pulpwood	49	51

Photo: Erkki Oksanen / Luke

▶ Roundwood trade

Wood trade volumes by roundwood assortment, 1995–2015

▶ Background data as a table



Prices of energywood sold by standing sales fell on the previous year

With regard to standing sales of energywood, forest owners were paid an average of EUR 3.1 per cubic metre for pruned stems in 2015. The average price of logging residues was slightly higher at EUR 3.4 per cubic metre. Stumps fetched EUR 1.0 and unpruned stems EUR 0.7.

The price of pruned stems was the highest in delivery sales at EUR 24.8 per cubic metre. The unit price for unpruned stems was EUR 19.8, and the unit price for logging residues and stumps was EUR 15.6.

Energywood prices in standing sales fell sharply in 2015, with the exception of the price of logging residues. The price paid for pruned stems was 24 per cent and the price paid for stumps 16 per cent lower in real terms than during the previous year. The price paid for pruned stems in delivery sales increased by eight per cent and the price of stumps by 33 per cent, while the price of logging residues remained similar to the previous year.

In addition to the price paid by byers, forest owners also received state subsidies for a large percentage of their small-diameter stands, and these subsidies are not included in the statistics. The subsidies raised forest owners' income from pruned stems and unpruned stems harvested from subsidised stands considerably. During the second half of 2015, for example, the subsidies paid for silvicultural works in young forests and the harvesting of small trees amounted to a total of EUR 450 per hectare. Divided by 50 cubic metres, which is the volume of wood harvested from a typical young thinning stand, subsidies therefore amounted to EUR 9 per cubic metre.

Energywood sales fell by one fifth

Energywood purchases reported in 2015 amounted to 3.5 million cubic metres, which is estimated to cover approximately two thirds of the total domestic energywood market. Pruned stems accounted for just over half and logging residues for one third of the purchases. unpruned stems accounted for nine per cent and stumps for four per cent.

Two thirds of all energywood was purchased by means of standing sales. Almost 85 per cent of all stumps and logging residues purchased were procured by means of standing sales, while the figures were 58 per cent for pruned stems and 40 per cent for unpruned stems.

Energywood purchases fell by a total of 11 per cent on the previous year in 2015. The volume of wood sold by standing sales decreased by almost one fifth, and the volume of wood procured by delivery sales increased by one eighth. Energywood sales suffered from factors such as the mild winter, existing energywood stocks, and the falling prices and good availability of other forms of energy.

▶ Energywood trade

Energywood prices in 2015.

	Standing sales, EUR/m^3	Increase/decrease on the previous year in real terms, %	Delivery sales, EUR/m^3	Increase/decrease on the previous year in real terms, %
Average	3.00	-8	22.42	7
Pruned stems	3.12	-24	24.78	8
Logging residues	3.40	8	15.60	0
Stumps	1.00	-16	15.60	33
Unpruned stems	0.72	-33	19.82	-3

Removals and drain

The volume of roundwood harvested from Finnish forests in 2015 was higher than ever before and amounted to a total of 68 million cubic metres. Record-high volumes of logs and pulpwood were harvested for the industrial sector. Their total volume, almost 59 million cubic metres, was five per cent higher than during the previous year and 12 per cent higher than than the average for the preceding ten-year period. More roundwood was also harvested for energy production than before: more than over nine million cubic metres.

Demand for forest industry products gave a boost to the roundwood market

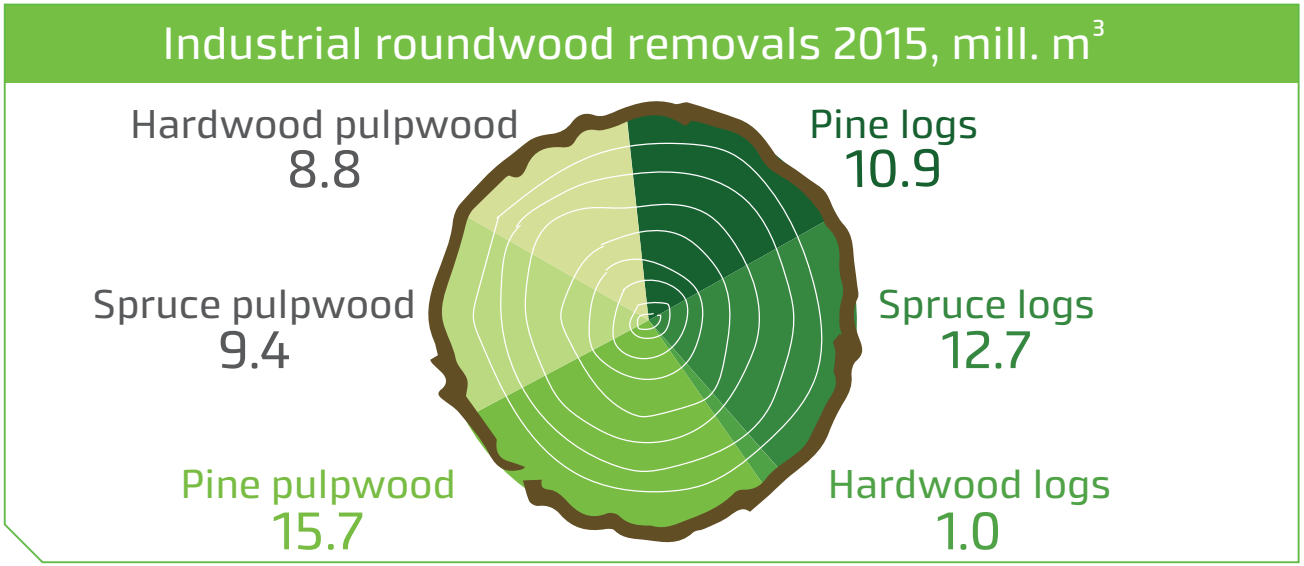
Of forest industry products, paperboard and pulp production in particular grew in 2015, which increased demand for the raw materials. The volume of wood harvested for the industrial sector rose to 58.5 million cubic metres, which was the highest figure since the compiling of felling statistics began. Growth on the previous year amounted to five per cent (2.6 million m^3). The previous felling record dates back to 2007, when the total felling volume amounted to just under one million cubic metres less, a total of 57.7 million cubic metres.

Logs accounted for 24.6 million cubic metres and pulpwood for 33.9 million cubic metres of the 2015 felling volume. The volume of logs increased by two per cent and the volume of pulpwood by six per cent on the previous year. Compared to the average previous 10 years, pulpwood removals grew by 16 per cent. The increase in the volume of logs amounted to eight per cent. Pine pulpwood (15.7 million m^3) and spruce logs (12.7 million m^3) were harvested the most.

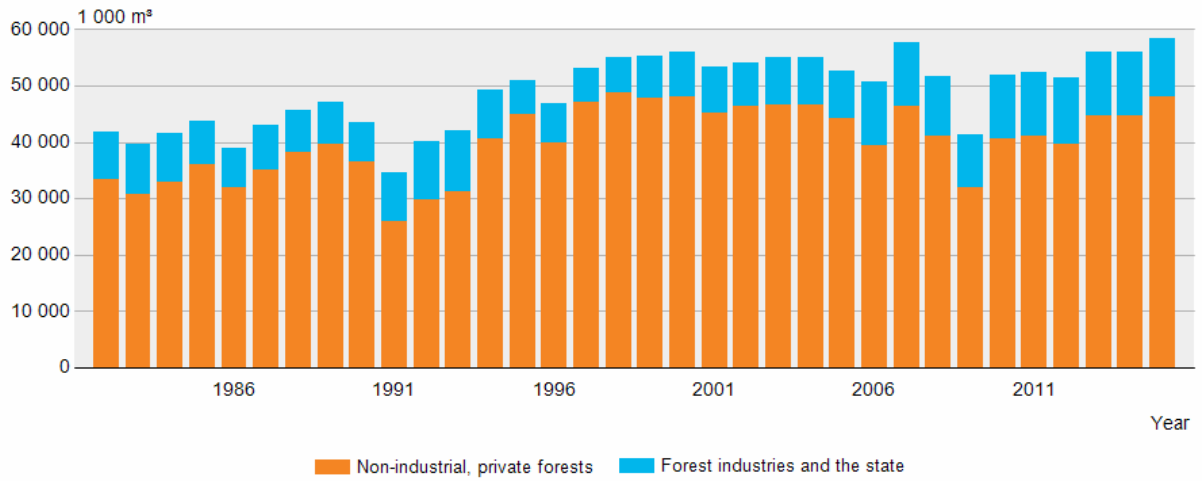
Felling statistics are now compiled on the basis of administrative regions instead of Forest Centre districts as before. In 2015, the highest felling volumes were reported in the heavily forested regions of Southern and Northern Savonia and Central Finland. A total of 6.4 million cubic metres of roundwood was felled in Southern Savonia, 5.6 million cubic metres in Northern Savonia, and 5.5 million cubic metres in Central Finland.

Non-industrial private forests accounted for four fifths of total removals

The majority of removals, four fifths, originated from non-industrial private forests, where a total of 48.1 cubic metres of wood was felled. The figure was up by eight per cent on the previous year. A total of 38.2 million cubic metres (79%) of wood harvested from non-industrial forests was sold by means of standing sales and the remaining 9.9 million cubic metres by by delivery sales.



Roundwood removals by forest ownership category, 1982–2015 ▶ Background data as a table



The total volume of roundwood removed for the total volume of industrial roundwood removals from the forests of forest industries and the state-owned forests managed by Metsähallitus amounted to 10.4 million cubic metres. The figure was eight per cent lower than during the previous year.

New record for total removals

Total removals represent the total volume of roundwood harvested from forests. In addition to roundwood sold to the forest industry and to the export market as discussed above, the figure also includes wood harvested by forest owners from their forests for their own use as well as roundwood harvested for energy production. The volumes (million m^3) of the aforementioned categories were as follows in 2015:

Total removals	**68.0**
Roundwood, of which	**58.8**
- forest industry and exports	58.5
- small sawmills	0.3
Energywood, of which	**9.2**
- households	5.4
- heat and power plants	3.8

A total of 68 million cubic metres of roundwood was removed from Finnish forests in 2015. The figure was the highest since the compiling of statistics began and almost three million cubic metres higher than during the previous year. The majority of the removals were logs and pulpwood harvested for raw material for the forest industry or for the export market: 58.8 million cubic metres in total (86%). The remaining 9.2 million cubic metres of roundwood was energywood, which can be turned into firewood for households or into forest chips for heat and power plants. Both roundwood and forest chip removals were record high, and total removals in 2015 consequently amounted to 14 per cent more than the average of the previous 10 years.

Logging residue and stumps also harvested

In addition to roundwood, a total of 3.5 million cubic metres of other wood was also harvested from forests. A total of 2.4 million cubic metres of logging residue and 0.8 million cubic metres of stumps were burnt as forest chips in heat and power plants. Households consumed 0.4 million cubic metres of this kind of wood. These wood categories are not included in the total removals of roundwood.

Drain also includes waste wood left in forests and natural drain

In addition to removals, the total drain of the growing stock also takes into account roundwood left in forests in connection with felling (9.6 million m^3 in 2015) and unusable natural deadwood (4.7 million m^3). The total drain rose to 82 million cubic metres in 2015 thanks record-high removals. The figure was four per cent higher than during the previous year.

The ratio between drain and tree growth is one of the most important indicators of sustainable wood production, as the volume of growing stock in forests increases when growth exceeds drain. The growth of Finnish forests has exceeded total drain every year since 1970, which means that the volume of wood has grown continuously. The average drain has been 77.5 million cubic metres per year over the last five years from 2011 until 2015. The figure equates to 77 per cent of the growth of all forests available for wood production.

Approximately 80 per cent of felling potential is realised

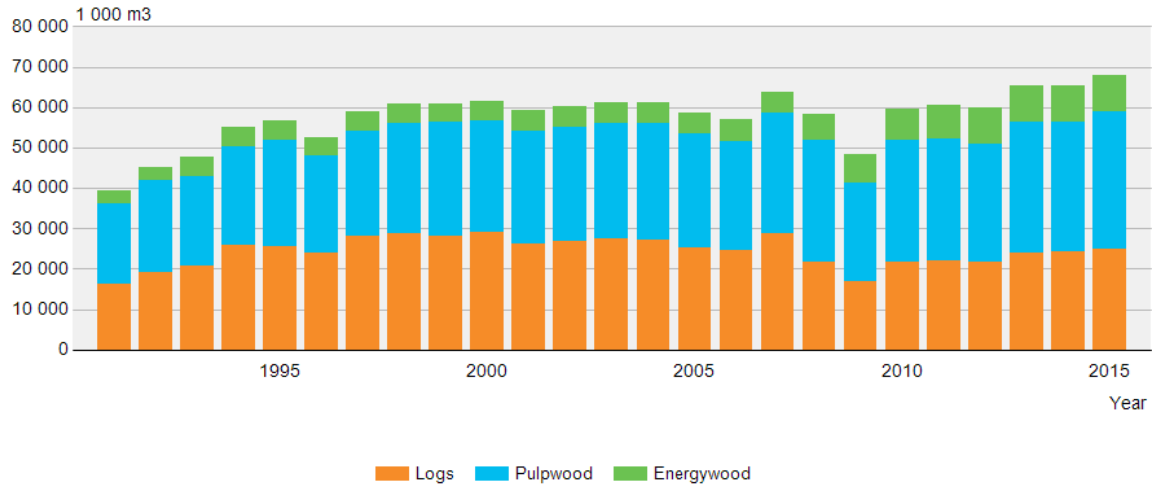
The maximum sustainable felling potential of Finnish forests has been estimated at approximately 81 million cubic metres of roundwood per year between 2011 and 2020. Total removals amounted to approximately 68 million cubic metres in 2015, which equated to 84 per cent of the total felling potential. Roundwood for the industrial sector (logs and pulpwood) accounts for 75 million cubic metres of the estimated felling potential and roundwood for energy production for six million cubic metres. Approximately 15 million cubic metres of roundwood logging residue and stumps can also be harvested for energy production in the form of forest chips each year.

More information on the statistics website

- Industrial roundwood removals and labour force
- Industrial roundwood removals by region
- Total removals and drain
- Felling potential

Total roundwood removals by roundwood assortment, 1991–2015

Background data as a table



The sustainable roundwood felling potential is 81 million cubic metres per year.

Stumpage earnings

Gross stumpage earnings are an estimate of the sales revenue of forest owners, calculated on the basis of annual roundwood removals and stumpage prices.

Stumpage earnings are calculated for each wood product and region as well as for different categories of forest owners, which include non-industrial private forests, state-owned forests managed by Metsähallitus, and forests controlled by forestry companies. The figures for the last two groups are combined in the statistics for data protection reasons. In addition to forests owned by private individuals, private forests also include forests owned or controlled by local authorities, parishes, joint owners, and foundations that are unrelated to the forest industry.

In addition to wood sales, stumpage earnings from private forests also include the value of wood removed by forest owners from their forests for their own use.

The graphs and annual comparisons are based on monetary values in real terms (deflated using the wholesale price index, 1949=100), while the figures in the Natural Resources Institute Finland's statistical database are nominal values.

▶ Stumpage earnings

Removals increased – stumpage earnings at EUR 2 billion

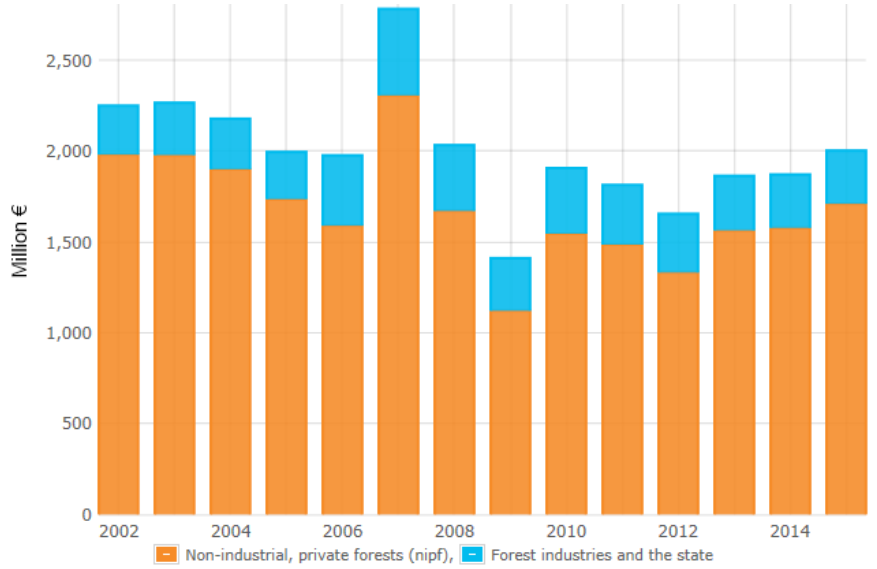
The gross stumpage earnings of forest owners amounted to EUR 2 billion in 2015. Earnings increased by five per cent on the previous year in real terms as a result of higher removals.

The earnings of private forest owners totalled EUR 1.7 billion (+6%) and those of forests industry and the state EUR 0.29 billion (-1%). Logs accounted for approximately 70 per cent of the total income.

In real terms, stumpage earnings were two per cent higher than the average of the previous 10 years. Earnings from private forests were six per cent higher and the highest since the peak year of 2007. The earnings of the forest industry and the state amounted to 13 per cent less than the average of the previous 10 years.

In terms of different regions, stumpage earnings were the highest in Southern Savonia (EUR 230 million), Central Finland (EUR 193 million), and Northern Savonia (EUR 173 million) in 2015.

Gross stumpage earnings by forest owner category in 2002-2015 at 2015 values



▶ Background data as nominal prices

Wood consumption

Total roundwood consumption has remained almost unchanged for the previous three years. Roundwood consumption amounted to a total of 74.3 million cubic metres in 2015, of which the majority – 64.7 million cubic metres – was used to manufacture forest industry products. A total of 9.6 million cubic metres of roundwood was burnt in energy generation.

In 2015, the forest industries' roundwood consumption totalled 64.7 million cubic metres, which was one per cent more than during the previous year and three per cent above the average of the previous five years. The forest industries' roundwood consumption was at its highest in 2004, 2006, and 2007, when it amounted to approximately 75 million cubic metres per year on average. The lowest consumption figure of recent times – 51.5 million cubic metres – was recorded during the recession in 2009.

Volumes of domestic wood on the rise

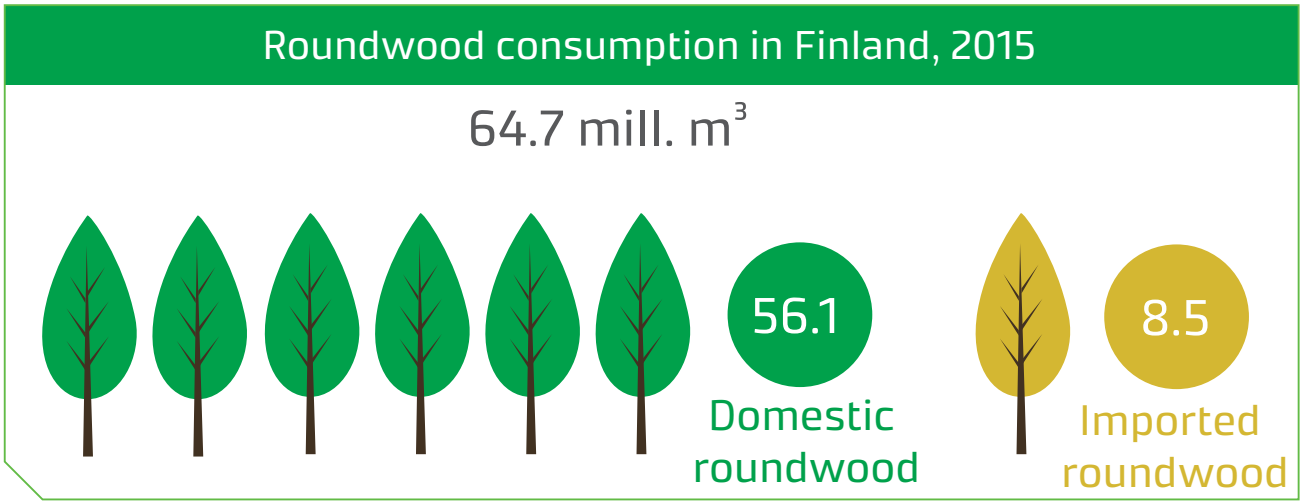
Domestic roundwood accounted for 56.1 million cubic metres of the roundroundwood processed by the forest industries in 2015 and imported roundwood for 8.5 million cubic metres. The consumption of domestic roundwood has grown slowly throughout the 2010s. The consumption was the highest in eight years in 2015, and the increase on the previous year amounted to two per cent.

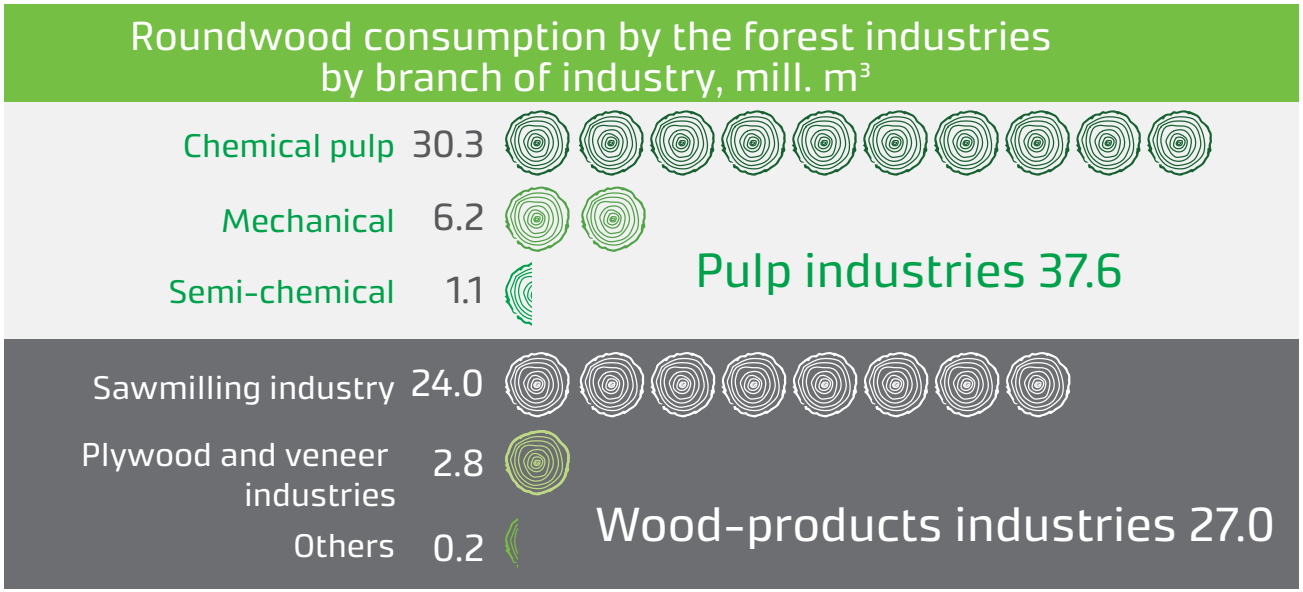
The consumption of imported wood has decreased in recent years. The forest industries processed a total of 8.5 million cubic metres of imported roundwood in 2015, which was four per cent less than during the previous year. Almost 60 per cent of all imported roundwood was hardwood pulpwood, primarily birch. The consumption of imported wood peaked in the mid-2000s, when it amounted to between 16 and 19 million cubic metres per year and at its highest accounted for just over one quarter of the forest industries' total roundwood consumption.

- Forest industries' wood consumption
- Wood in energy generation
- Total wood consumption

Almost half of all roundwood was used by the chemical pulp industry

Compared to the previous year, wood consumption increased both in wood-products industries and pulp industries by one per cent. The chemical pulp industry consumed the most roundwood, 30.3 million cubic metres in total (+3% on the previous year), which accounted for almost half of the total roundwood consumption. The majority of the forest industries' by-products, a total of 70 per cent of 8.9 million cubic metres, were also consumed by the chemical pulp industry. The sawmilling industry consumed the second highest amount of roundwood, 24.0 million cubic metres (+2%). The most important roundwood assortments used by the forest indus-





of this, mostly in the form of forest chips (7.3 million m³) as well as various kinds of forest industry by-products and other wood fuels (10.9 million m³). The most important by-product was bark, which accounted for almost 70 per cent of all solid by-products. Small-scale housing consumed 5.4 million cubic metres of fuelwood and 1.3 million cubic metres of various kinds of wood residues from the forests, sawmilling, and construction. Roundwood accounted for 9.6 million cubic metres of solid wood fuels, which included the fuelwood consumed by small-scale housing as well as forest chips manufactured from stemwood and consumed in heating and power plants.

tries were pine and hardwood pulpwood (15.9 million m³ and 13.0 million m³, respectively).

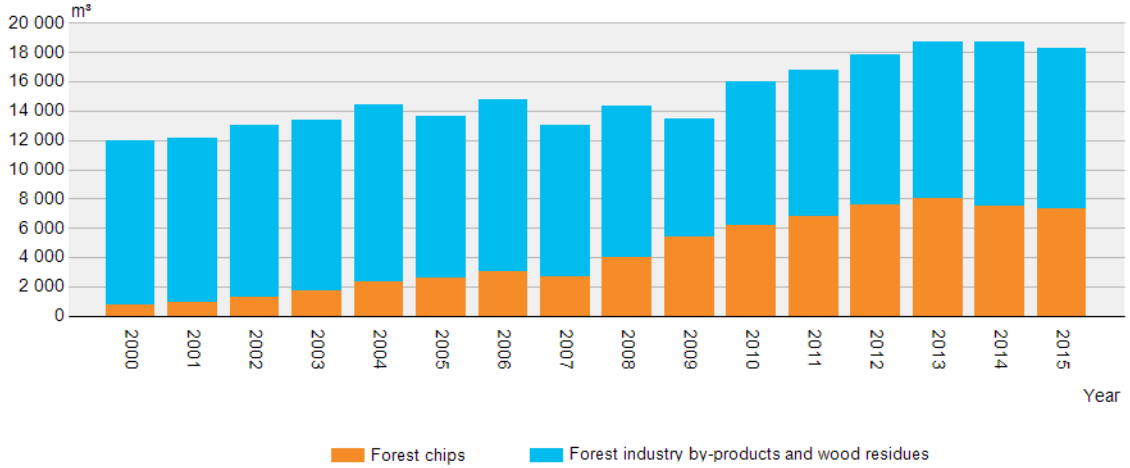
Wood is the most significant energy source

Wood fuels were the most important source of energy in Finland in 2015, and they accounted for more than one quarter of the total energy consumption. Wood fuels can be divided by their form into solid, liquid (black liquor), and other wood fuels.

A total of 25.0 million cubic metres of solid wood fuels were consumed in Finland in 2015, which was almost the same volume as during the previous year. Heating and power plants consumed 18.3 million cubic metres

Solid wood fuel consumption in heating and power plants, 2000–2015

Background data as a table



Forest chips consumption has decreased and is behind target

Heating and power plants consumed 7.3 million cubic metres of forest chips in 2015, which was three per cent less than during the previous year and eight per cent less than during the peak year of 2013. Together with the forest chips burnt in small-scale housing, total consumption amounted to 8.0 million cubic metres in 2015.

The total consumption of forest chips has, despite targets and subsidies, decreased during the last two years. The revised National Forest Programme 2015 set the target for the consumption of forest chips in 2015 at between 10 and 12 million cubic metres, which turned out to be far too ambitious.

The 2013 Energy and Climate Strategy set the target for the consumption of forest chips in 2020 at 13.5 million cubic metres. The idea was for this amount to cover half of the required increase in renewable energy in order to meet the renewable energy target set for Finland in the EU's Renewable energy directive, which is 38 per cent of final energy consumption. According to the EU's statistical office Eurostat, Finland reached its target already in 2014.

Key figures on forest industries in 2015.

	Unit	2015	Change 2015/2014, %
Forest industries' production			
Softwood sawn goods	million m^3	10.6	-3
Chemical pulp	million tonnes	7.1	2
Paper	"	7.3	-1
Paperboard	"	3.1	4
Forest industries' turnover	EUR billion	25.5	3
Wood-products industries	"	6.2	0
Pulp and paper industries	"	19.3	4
Forest industries' investments	EUR million	945	83
Wood-products industries	"	200	21
Pulp and paper industries	"	745	112
Investment rate, forest industries	%	22	+9 percentage points
Employed persons in the forest sector	1,000 persons	64.9	1
Forestry	"	25.4	-1
Wood-products industries	"	21.7	6
Pulp and paper industries	"	17.8	-3
Value added in the forest sector*	EUR billion	7.6	5
Forestry*	"	3.3	1
Wood-products industries*	"	1.2	7
Pulp and paper industries*	"	3.1	9

Investments, turnover, and value added: change in real terms, deflated using the wholesale price index (1949=100).
*Preliminary data. Investment rate: value of investments / value added current prices (both figures based on national accounts).
Sources: Statistics Finland and Finnish Forest Industries Federation.

Pulp and paperboard production on the rise

The forest industries showed several positive signs in 2015. Chemical pulp production (7.1 million tonnes) grew by two per cent and paperboard production (3.1 million tonnes) by four per cent on the previous year. Paper production, on the other hand, decreased for the fifth year in a row and amounted to 7.3 million tonnes.

Despite increased demand in the export market, the production of softwood sawn goods decreased by three per cent to 10.6 million cubic metres. The decrease was mostly due to a drop in domestic construction volumes. Nevertheless, the volume of sawn goods produced in 2015 was in 2015 two per cent higher than the average of the previous 10 years.

The forest industries' turnover from domestic operations increased to EUR 25.5 billion in 2015, which equated to a three per cent increase on the year 2014 in real terms. The pulp and paper industries contribution to the turnover was approximately three quarters, similarly to previous years.

Pulp and paper industries' investments doubled

Forest industries' investments grew to EUR 0.95 billion in 2015. The increase on the previous year amounted to as much as 83 per cent of real terms. Investments of the pulp and paper industries more than doubled and amounted to EUR 0.75 billion. Forest industries' investments were just over 10 per cent higher than the average of the previous 10 years. The investment rate, i.e. the value of investments relative to the industries' value added, was 22 per cent, the highest since 2008.

Employment in the wood-products industries increased

The number of persons employed in the forest industries - 39,500 in 2015 - was two per cent higher than during the previous year. The wood-products industries employed 21,700 persons (+6% on the previous year), while employment in the pulp and paper industries shrank by three per cent to 17,800 persons. Employment in the forest industries has fallen rapidly in the 2000s due to factors such as increased productivity and the closure of industrial plants. At the beginning of the millennium, the forest industries still employed more than 70,000 wage earners and salaried employees.

Employment in the forestry has been more stable, and the number of persons employed by this industry has increased slightly in recent years. In 2015, forestry employed 25,400 people, on an average.

Photo: Erkki Oksanen / Luke

The value added in the forest sector in 2015 amounted to EUR 7.6 billion, which was 4.2 per cent of the value added by all industries. The share of forestry accounted for 1.8 per cent, the wood-products industries for 0.7 per cent, and the pulp and paper industries for 1.7 per cent. The figures are provisional and based on the national accounts compiled by Statistics Finland.

Foreign trade by forest industries

The value of Finland's goods exports amounted to EUR 53.9 billion and the value of forest sector exports to EUR 11.7 billion in 2015. Almost all of the value of forest sector exports these days is attributable to forest industry products, and unprocessed wood only accounts for less than one per cent. The majority of forest sector products are sold to foreign markets. In fact, the forest sector is one of the biggest exporters in Finland, as it accounts for 22 per cent of the total value of goods exports. The forest sector's contribution to the value of Finnish goods exports has been increasing in recent years. At its lowest, its share was 18 per cent during the slump year of 2008.

The most forest industry exports are sold to the European Union

Finland has had a trade deficit in goods exports for the last five years, i.e. imports have exceeded exports. However, the deficit amounted to just EUR 0.6 billion in 2015, which was considerably less than before. The value of Finnish goods exports shrank by one per cent on the previous year in real terms. During the same period, the value of Finland's forest industry exports amounted to EUR 11.6 billion, which equated to an increase of six per cent on the previous year in real terms.

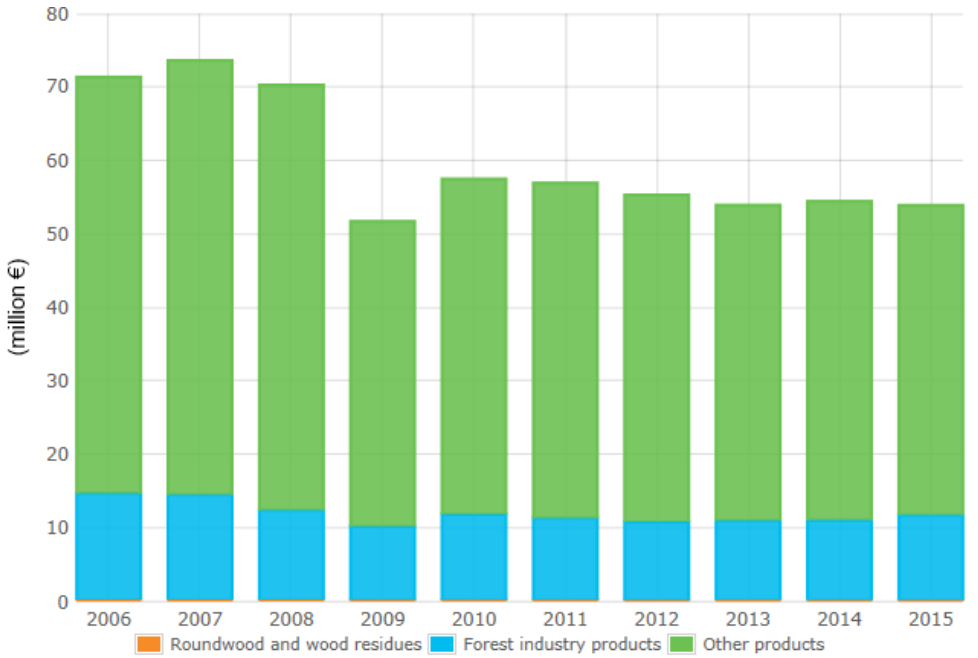
The European Union is the biggest target market for Finland's forest industry products. A total of 58 per cent of forest industry export income originated from the European Union. Together, European countries contributed two thirds of the total income. Exports to Asia accounted for 18 per cent and exports to North America for seven per cent. The European Union's share has decreased in the last 10 years, that of Asia has grown, and that of North America has remained relatively stable. Of individual countries, the most significant individual country was Germany.

Paper is the most important forest industry product

Pulp and paper industry products accounted for 78 per cent (EUR 9.1 billion) of the value of forest industry exports, and the remainder was attributable to the wood products industry. The most important product was paper, the export value of paper amounted to EUR 4.6 billion. Although the value of paper exports increased slightly on the pre-

Value of exports of Finland, 2006–2015

Link to release



Value of forest industry exports by target country in 2015.

	Value, EUR billion	%
All countries	**11.59**	**100**
Germany	1.87	16
United Kingdom	1.14	10
United States	0.75	6
China	0.72	6
Belgium	0.59	5
Japan	0.46	4
Russia	0.44	4
Italy	0.44	4
Spain	0.43	4
Sweden	0.42	4
Others	4.32	37

vious year, the trend has been downwards for approximately 10 years already. This is due to both the drop in paper prices in real terms and a decrease in the exported volume. The most significant customers in paper were Germany (EUR 0.9 billion) and the UK (EUR 0.6 billion).

The next most important forest sector products exported were paperboard and pulp, which contributed EUR 2.3 billion and EUR 1.8 billion respectively. The export value of both these increased both on the previous year and compared to the average of the previous five years. The most paperboard was exported to Germany (EUR 0.4 billion) and the most pulp to China (EUR 0.5 billion).

Forest industry exports in the most important product groups in 2015.

		Increase/decrease in real terms	
	Value of exports 2015 EUR billion	on the previous year, %	on the average of the previous five years, %
Finland's goods exports	**53.9**	**-1**	**-3**
Forest industry products, of which	**11.6**	**6**	**5**
Paper	4.6	3	-7
Paperboard	2.3	11	16
Pulp	1.8	15	26
Sawn goods	1.6	4	19
Plywood	0.5	3	16

Value of exports of Finnish forest industry products, 2006-2015

Link to release

The value of wood product exports amounted to EUR 2.5 billion, of which EUR 1.6 billion was attributable to sawn goods. The export value of sawn goods grew by four per cent on the previous year in real terms and by 19 per cent on the average of the previous five years. The most sawn goods were exported to Egypt (EUR 0.2 billion). The value of plywood exports amounted to EUR 0.5 billion.

Finland imports few forest industry products compared to exports. In 2015, the value of forest industry imports amounted to EUR 1.4 billion. The most important product group was paper and paperboard products (EUR 0.2 billion). The most forest industry products were imported to Finland from Sweden (EUR 0.3 billion).

Foreign wood is an important raw material for the Finnish pulp industry

Although wood imports peaked as far back as between 2005 and 2008, foreign wood is still an extremely important raw material for Finnish industry. Wood importing has halved since the peak years. During the peak years, imported wood accounted for almost one third of the total wood purchases of the forest industry. In 2015, imported wood accounted for approximately one seventh of all wood purchases. A total of 9.6 million cubic metres of roundwood was imported to Finland in 2015. Most of the imported wood went to the pulp industry, as 88 per cent of the volume was either pulpwood of wood chips. Logs accounted for six per cent. Birch pulpwood was imported the most: 4.8 million cubic metres in total. The next biggest category was wood chips at 2.5 million cubic metres. The volume of all other imported products amounted to no more than half a million cubic metres.

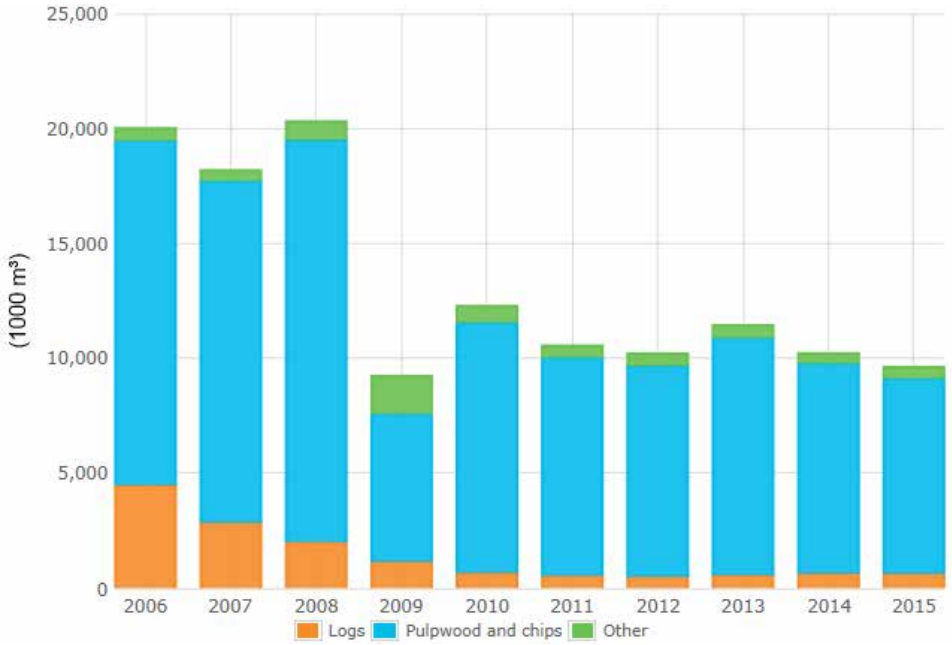
The majority of foreign wood is imported to Finland from Russia. A total of 8.0 million cubic metres of wood was imported from Russia in 2015. The next biggest foreign wood suppliers were Estonia (0.9 million m^3) and Latvia (0.5 million m^3). Russia's share of Finland's wood imports has been growing since the slump in 2008–2010, when it dropped to as low as approximately 60 per cent. In 2015, Russian wood accounted for 83 per cent of all imported wood.

Finland exported 1.3 million cubic metres of wood in 2015. The volume of roundwood exports was almost the same as during the previous year, but wood waste exports shrank considerably. Almost four fifths of all wood exported from Finland was sold to Sweden.

▶ Foreign trade in forest industry products

Wood imports, 2006–2015

▶ Link to release



Profitability of private forestry

The profitability of non-industrial private forestry is measured by statistics on operating profit and return on assets based on standing stock stumpage value. In addition to forests owned by private individuals, private forests also include forests owned or controlled by local authorities, parishes, joint owners, and foundations that are unrelated to the forest industry.

Profitability statistics are based on other forestry statistics

The income figures used in the calculations are based on gross stumpage earnings and state subsidies paid towards energywood harvesting and wood production. The cost figures are based on data on the costs of silviculture and forest improvement works as well as the administrative and other costs related to forest ownership.

The graphs and annual comparisons are based on monetary values in real terms (deflated using the cost-of-living index, 1951=100). The figures in the tables and in the Natural Resources Institute Finland's statistical database are nominal values. The surface areas of forests are based on National Forest Inventories. The cost figures for 2015 are provisional.

Costs are deducted from earnings to calculate private forest owners' operating profit

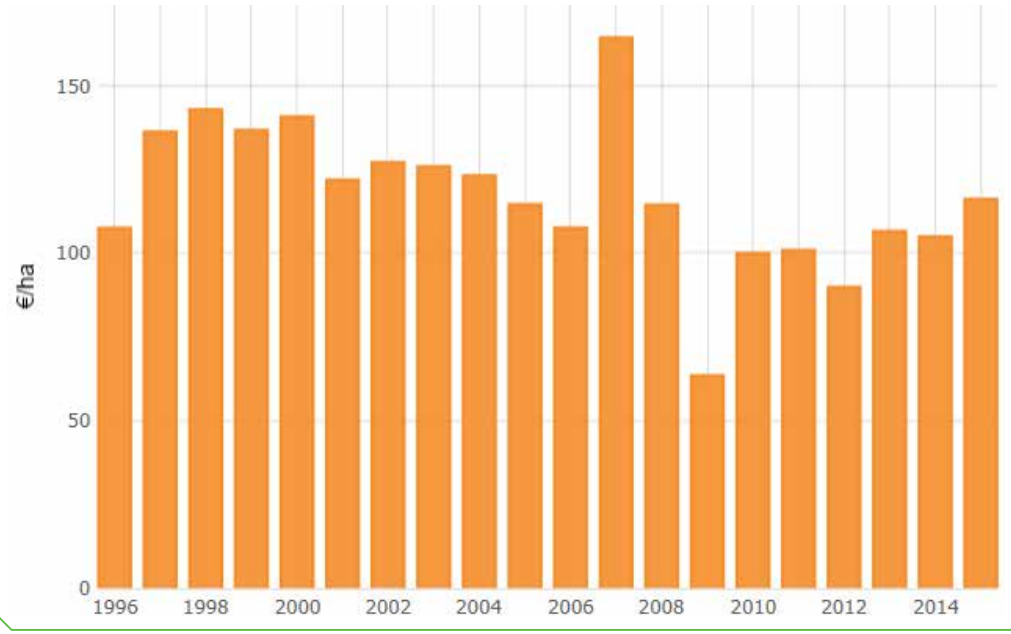
Private forest owners' operating profit is reported as a profit margin, which is calculated by deducting costs from wood production earnings. The calculation gives the amount of money left over for private forest owners to spend on taxes and debts, investments, and purchases. Calculated in this way, operating profit only takes account of cash flows and not the effect that factors such as increases in growing stock or removals that reduce its value have on the total wood production profit.

Operating profit at more than EUR 1.5 billion

Private forest owners' operating profit rose to EUR 1.53 billion in 2015 thanks to higher felling volumes. The increase on the previous year amounted to 8 per cent in

Operating profit in non-industrial private forestry in Finland

Link to release



real terms, and the change was consistent with the average of the previous 10 years. Private forest owners' earnings were four per cent higher than during the previous year and amounted to EUR 1.7 billion. Based on provisional data, the total costs of wood production – investments and administrative costs – amounted to approximately EUR 230 million. Based on provisional figures, the per-hectare profit amounted to EUR 114. The highest profit so far, EUR 164 per hectare, was recorded in 2007, when earnings peaked while costs remained at an average level. The lowest profits were recorded during the recession of the early 1990s.

▶ Operating profit in private forestry

Private forest owners' operating profit has taken an upward turn in recent years.

Photo: Erkki Oksanen / Luke

Statistics on forestry as an investment describe the return on assets based on growing stock stumpage value

Statistics on forestry as an investment break down the return on private forest owners' into various components. Return on assets is a profitability ratio that gives the annual return on capital (stumpage price of growing stock) as a percentage. It is calculated as a natural logarithmic transformation relative to earnings, operating costs, changes in the value of assets, and capital. Thanks to the logarithmic transformation, time series on revenue can be used to calculate figures such as averages and dispersions.

The components that make up private forest owners' return on assets include income from wood sales, which are based on removals and stumpage prices, total wood production costs, state subsidies for forestry, the value of the net increment, and changes in stumpage prices. Fore more information, visit the statistics website.

Income from wood sales the biggest contributor to revenue in 2015

Based on provisional data, return on assets on non-industrial private forests was 2.5 per cent in real terms in 2015. The figure was 0.2 percentage points up on the previous year but 1.3 percentage points down on the average of the previous 10 years. The highest return on assets in the last 10 years was recorded in 2007 (26.0%) and the lowest in 2009 (-17.7%).

Income from wood sales is the most important of the various revenue components. In 2015, income from wood sales increased revenue by 3.6 percentage points. Revenue also increased thanks to the value of the net increment (1.2 percentage points) and state subsidies for wood production (0.1 percentage points). However, the drop in stumpage prices in real terms (-1.7) and wood production costs (-0.6) reduced revenue.

▶ Forestry as an investment

Return on assets on wood production

▶ Background data as a table

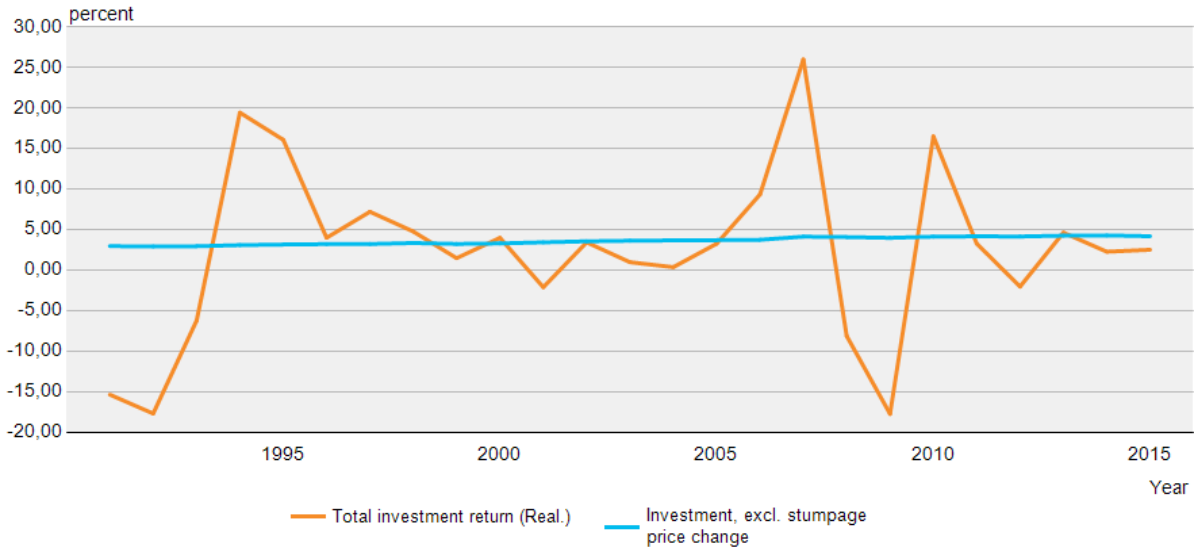


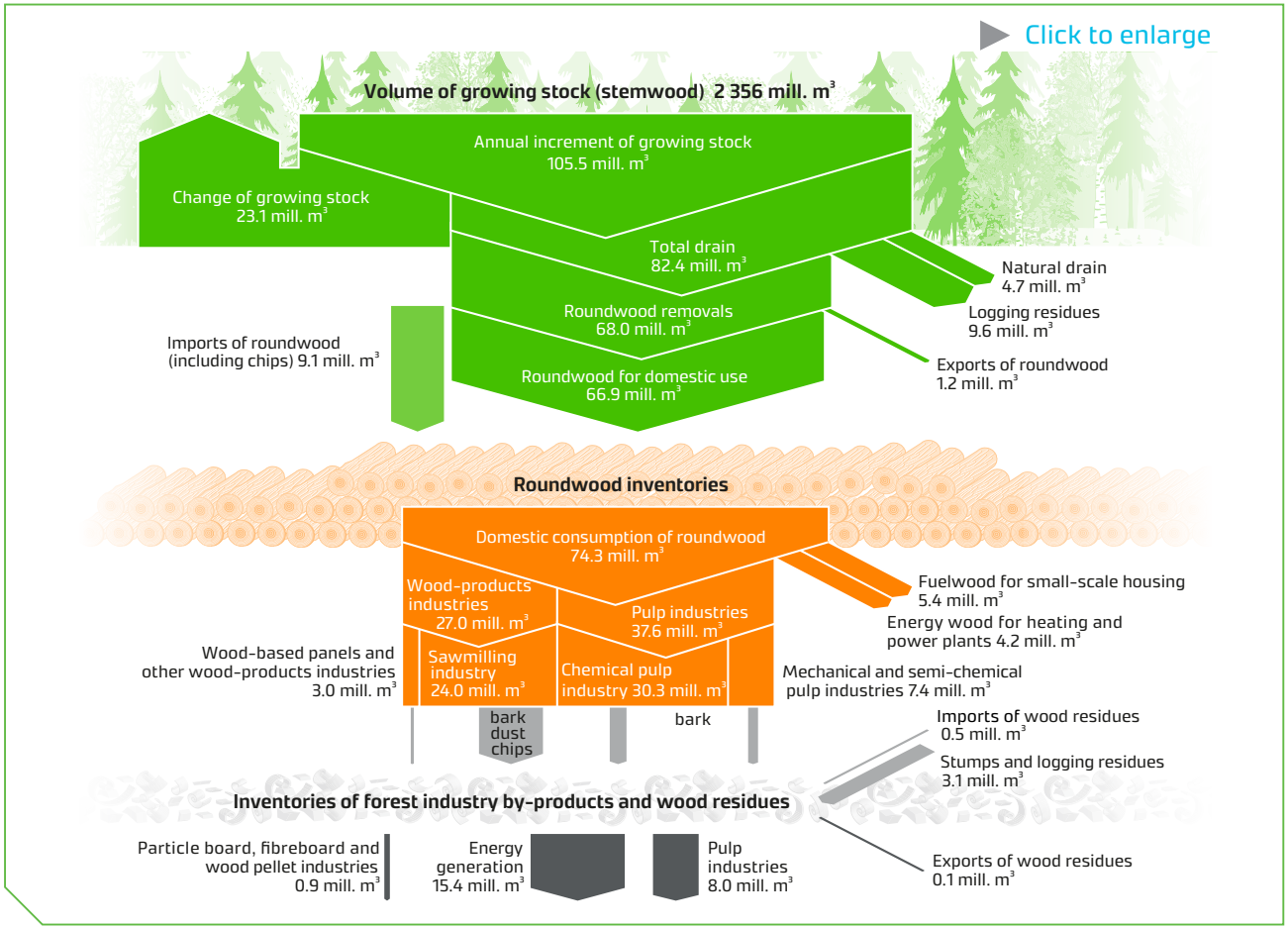
Photo: Erkki Oksanen / Luke

Finland's wood flows in 2015

The total volume of the growing stock (stemwood only) in Finland's forests currently amounts to 2 356 million m^3 over bark. The majority of roundwood removed from our forests is used as raw material in industrial processes, and the rest is used to produce energy. In addition to stems, branches and stumps are also used for energy production, but the green (roundwood production) and orange (roundwood consumption) sections of the figure only include stems. By-products and wood residues also include other parts of trees.

The annual increment of the growing stock has risen to 105.5 million cubic metres of stemwood. In 2015, the total drain of stemwood was 82.4 million m^3. The difference between the increment and drain (23.1 million m^3) increased the growing stock volume.

The drain of stemwood consists of fellings and natural drain (naturally dead trees). The volume of roundwood for domestic consumption (76.0 million m^3) is calculated as the volume of roundwood removals (68.0 million m^3) plus imports and minus exports of roundwood. Roundwood is then temporarily stored in roundwood inventories and is later consumed as raw material for domestic forest industries or energy generation. Domestic consumption of roundwood in Finland amounted to 74.3 million cubic metres, which equated to a computational increase of 1.7 million cubic metres in roundwood inventories.



The grey colour at the bottom of the diagram depicts the volume of solid wood by-products and wood residues left over from industrial processes or originating from other sources. They are primarily used to produce energy or as raw material in the pulp industry

Fisheries and hunting statistics

Photo: Panu Orell / Luke

Fisheries and hunting statistics for 2015

Commercial marine fishing

Finland's commercial marine fishing catch amounted to 148 million kilograms in 2015. Baltic herring accounted for 131 million kilograms and sprat for 12 million kilograms of the total. The majority of the Baltic herring and sprat were caught by trawling offshore. However, the majority of commercial fishermen used gillnets or trap nets to catch perch, European whitefish, pikeperch, salmon, and pike close to the shore.

Aquaculture

Approximately 14.9 million kilograms of fish was produced for human consumption in Finland in 2015, which was approximately 1.4 million kilograms more than during the previous year. Rainbow trout accounted for 13.9 million kilograms, European whitefish for 0.8 million kilograms, and other species for approximately 0.2 million kilograms combined. New farming techniques and locations are believed to improve the status of the aquatic environment, make the environmental permit procedure more straightforward, and enable higher fish production volumes.

Fish processing

A total of 46 million kilograms of all fish processed in 2015 was Finnish and 34 million kilograms was imported. Besides Norwegian salmon, the most important species used by the processing industry were rainbow trout, Baltic herring, and European whitefish. These four species accounted for 97 per cent of the total.

Producer prices for fish

Fishermen were paid an average of EUR 0.19 per kilogram for Baltic herring in 2015. Baltic herring sold for human consumption fetched an average of EUR 0.27 per kilogram and Baltic herring sold to the industrial sector EUR 0.16 per kilogram. Almost 80 per cent of the Baltic herring catch of 2015 was sold to the industrial sector, mostly to be used as animal feed. Of farmed fish, rainbow trout fetched EUR 3.59 per kilogram and European whitefish EUR 9.46 per kilogram. The most valuable fish caught at sea was pikeperch. It fetched EUR 5.69 per kilogram.

Foreign trade in fish

A total of 112 million kilograms of fish and fish products were imported to Finland in 2015. The total value of imports was EUR 374 million. Two thirds of the imported volume were products intended for human consumption. Fresh Atlantic salmon from Norway was the most important import.

Finland exported 69 million kilograms of fish and fish products. Fish intended for human consumption accounted for approximately 70 per cent of the total volume. Approximately 70 per cent of all imports were sold to Denmark, the majority of which were Baltic herring for human consumption and for use as animal feed.

Fishery revenue and employment

The latest data on fishery revenue and employment are from the year 2014. There were 1,789 fishery businesses in 2014, and the total revenue of the fishery industry was EUR 957 million. The fishery industry produced EUR 153 million in value added and provided 2,827 person-years of work in employment. Fishing companies accounted for 72 per cent of all fishery businesses. The fishery sector with the highest revenue and employment was fish processing.

Fish consumption

Finns consumed the equivalent of just over four kilograms of filleted Finnish fish per capita in 2015. Imported fish consumption amounted to approximately 10 kilograms. The most consumed domestic fish species was rainbow trout (1.3 kilograms), and the most consumed foreign fish species was farmed salmon. Foreign salmon consumption equalled the total amount of all domestic fish species (4.1 kilograms).

Hunting

A total of 306,277 hunters paid the annual game management fee in 2015. Approximately 202,000 of them actually engaged in hunting. Approximately 170,000 people hunted small game and approximately 110,000 hunted deer.

Of all game species, the most hunted were mallard (approximately 249,000) and common wood pigeon (approximately 235,000). Raccoon dog (approximately 160,000) and alpine hare (153,000) were the most hunted mammals.

Commercial freshwater fishing and recreational fishing

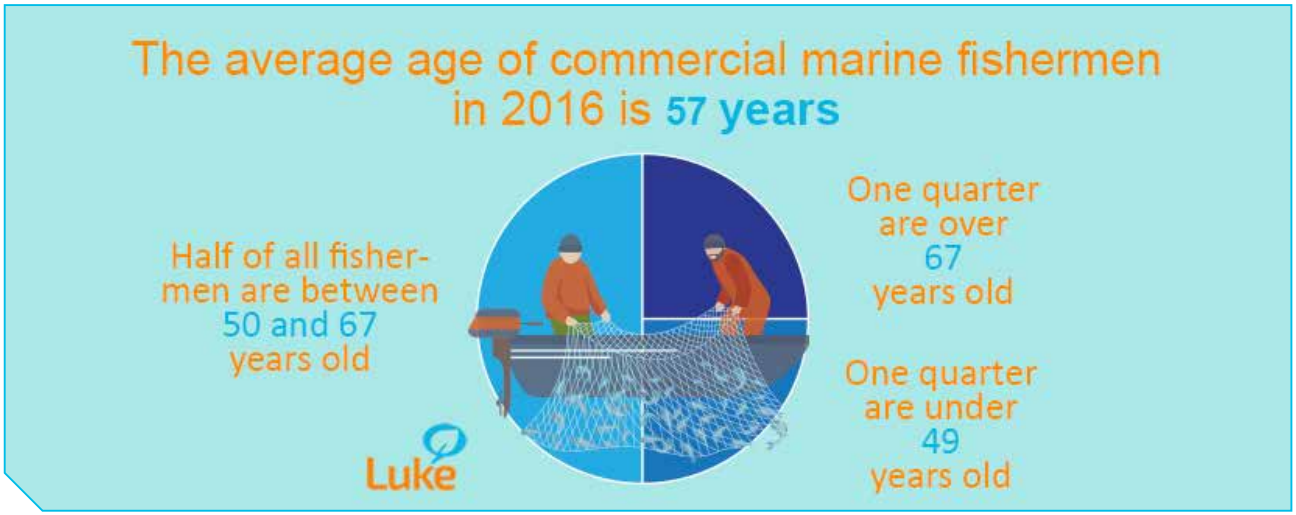
The latest data on commercial freshwater fishing and recreational fishing are from the year 2014. The commercial freshwater fishing catch amounted to approximately six million kilograms in 2014, of which almost half was vendace. Recreational fishermen caught a total of approximately 29 million kilograms of saltwater and freshwater fish.

http://stat.luke.fi/en/

Commercial marine fishery

The commercial marine fishermen's register contained approximately 2,100 fishermen in 2015. One quarter of them received at least 30 per cent of their income from fishing. The number of fishermen has decreased and their average age has risen in the last few decades. Young people no longer see fishing as an attractive profession but as physically demanding work that requires high investments and provides uncertain returns.

Fishing vessels registered for commercial fishing numbered just over 2,700. The majority of them were less than six metres long and primarily used in inshore trap net and gillnet fishing, but the longest vessels were sturdy offshore vessels of 40 metres in length.



Infographic: Sanna Kettunen

Baltic herring is the most important species in commercial fishing

Fishing vessels registered to Finland caught a total of 148 million kilograms of fish at sea in 2015. The catch was similar in size to that of the previous year but worth EUR 7 million less, as its value amounted to EUR 34 million. Baltic herring was by far the most important species both in terms of volume and value. Baltic herring accounted for 90 per cent of the total catch and for 70 per cent of its value. The reason for the lower value of the catch was the lower price paid to fishermen for Baltic herring sold for animal feed than during the previous year. The sprat catch was the second largest at 12 million kilograms. Almost all the sprat was turned into animal feed, while the figure for Baltic herring was four fifths. Other economically important species were European whitefish, pikeperch, perch, and salmon. Two thirds of the catch originated from the Bothnian Sea and one fifth from the Archipelago Sea.

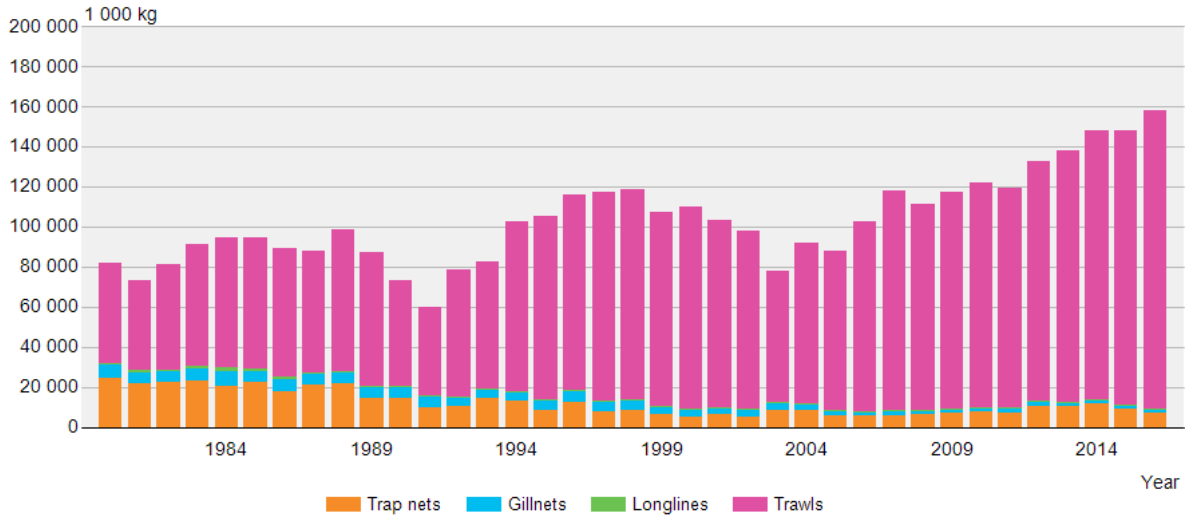
Fish for animal feed caught with trawls offshore, fish for human consumption with trap nets and gillnets close to the shore

The majority of the Baltic herring and sprat were caught by trawling offshore. One third of the Baltic herring catch and two thirds of the sprat catch were landed in Swedish and Estonian ports. Fish caught close to the shore using trap nets and gillnets had a big impact locally. Most of the catch was used for human consumption, and it fetched a better price than the fish caught for animal feed using trawls.

At the beginning of the 1980s, fish caught by gillnets and trap nets still accounted for 40 per cent of the total catch. The percentage of fish caught with trawls grew after that time, as demand for Baltic herring decreased, prices fell, and more efficient fishing techniques had to be devised to maintain profitability. The volume of damage caused by seals to both catches and the gillnets and trap nets used in fishing increased in the 2000s to the point where many fishermen either took a break or stopped fishing

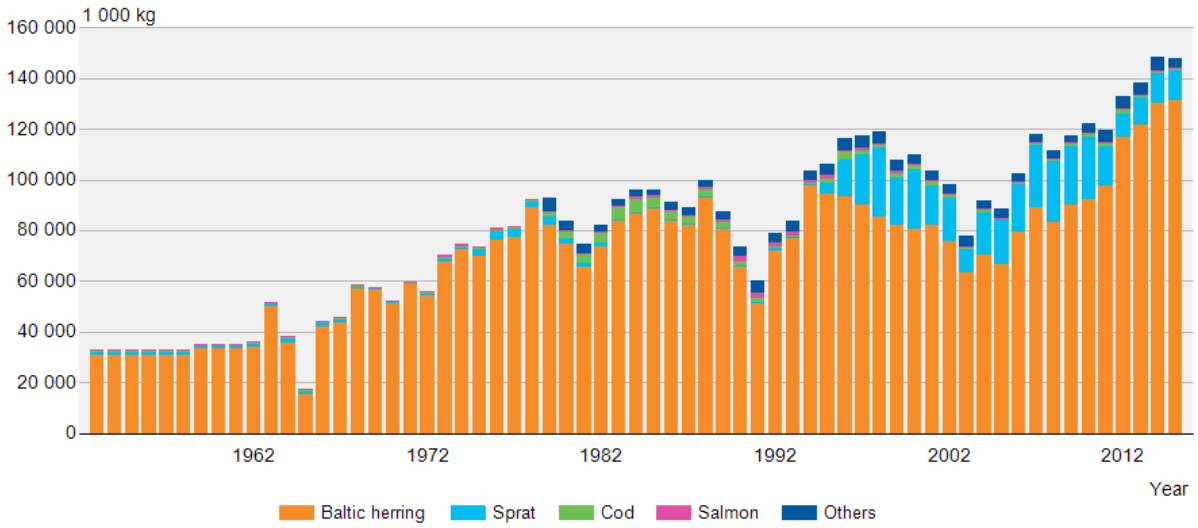
Catches in commercial marine fishery by gear, 1980–2015

Background data as a table



Finland's commercial marine fishery catch, 1953–2015

Background data as a table



altogether. Trawling accounted for a total of 93 per cent of the 2015 catch.

Catch sizes have grown considerably

Official statistics on Finland's catch sizes have been compiled since the 1950s. The statistics were updated twice in the 1950s, based on fishing in 1953 and 1959, and annual statistics have been published since 1962.

The total catch has grown from 40 million kilograms to 148 million kilograms in the space of six decades. Baltic herring, sprat, cod, and salmon catches in particular have fluctuated considerably. The fluctuations have been due to factors such as the introduction of new fishing techniques, demand for fish used as animal feed, changes in fish stocks, and fishing quotas. Considerably more efficient fishing techniques began to emerge in the 1950s, which enabled larger and larger catches. The number of fur farms also began to increase around the same time, and demand for Baltic herring grew. Fur farms' animal feed needs fell in the early 1990s, and demand for Baltic herring dropped. Baltic herring fishing increased again in the 2000s, when some of the largest trawlers were sold to foreign fishermen and the landing of catches in Sweden and Estonia became more common. Sprat catches began to grow quickly in the mid-1990s as sprat numbers increased. The catch grew from four million kilograms to 27 million kilograms in four years, and catch sizes have been high ever since. Cod and salmon numbers have also fluctuated, and fishing quotas have consequently affected catch sizes.

Commercial marine fishery

Commercial inland fishery

According to the latest statistics, commercial fishermen caught six million kilograms of freshwater fish in 2014, which was worth approximately EUR 11 million. The figure is more than one million kilograms more than during 2012, the year on which the previous statistics were based. The total value of the catch also increased by just over EUR 1 million.

Vendace the most important freshwater species

According to statistics, commercial fishermen caught 11 different species of fish and two different species of crayfish in 2014. The most important species in terms of value and volume was vendace. Vendace catches peaked in the early 1980s, when vendace accounted for approximately three quarters of the total catch. At the beginning of the 1990s, however, vendace catches fell to approximately one million kilograms, which accounted for just one quarter of the total catch. This was due to vendace numbers having plummeted in several lakes around the country. Since the recovery of vendace stocks at the beginning of the 21st century, catch sizes have been relatively constant at just under three million kilograms.

Freshwater pikeperch and European whitefish among the most popular species

After vendace, the most valued freshwater fish have been pikeperch, European whitefish, and perch. European whitefish catches peaked at approximately one million kilograms in the early 1990s when vendace catches plummeted, but fell to just one tenth of that figure in the 2000s. While European whitefish catches have decreased, pikeperch catches have continued to grow.

Statistics on fish stock management catches compiled since 2008

Fish caught in connection with fish stock management in lakes accounted for just over one quarter of professional fishermen's freshwater fishing catch in 2014. Most of the catch was made up of cyprinids and other small, low-value fish. Fish stock management catches have amounted to approximately one million kilograms per year, of which only some is likely to be used for human consumption.

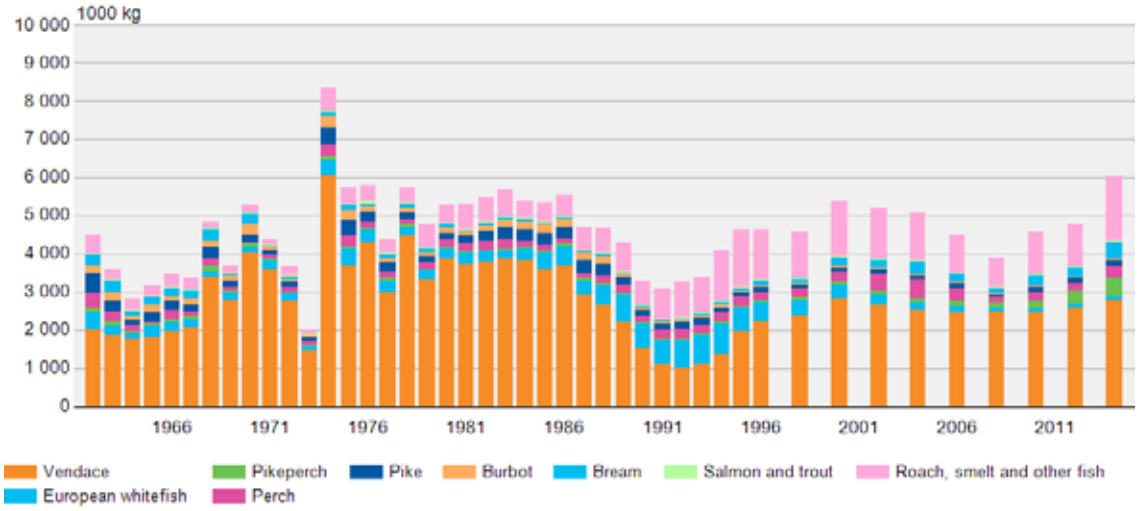
Annual fluctuations in catch sizes

Catch sizes fluctuate in the long term not just due to changes in fish stocks and weather conditions but also as a result of new fishing techniques, regional fishing restrictions, restrictions specific to certain species, and changes in minimum fish sizes. Professional vendace fishing techniques, for example, have changed over time. Although techniques have developed over the years, the methods used to compile statistics on commercial fishing have remained largely the same since 1987.

▶ Commercial inland fishery

Finland's commercial inland fishery catch in 1962–2014

▶ Background data as a table



Recreational fishing

There were just under 1.6 million recreational fishermen in Finland in 2014, when they numbered almost two million at the beginning of the millennium. Almost one in three Finns, approximately 30 per cent, engages in recreational fishing. The figure is approximately 40 per cent among men and approximately 20 per cent among women.

Rod and line the most popular method

Rod and line was by far the most popular method, and almost one million fishermen (61%) used a rod and line. The next most popular were spinning rod (43%), ice fishing rod (32%), trolling (29%), and fly fishing (5%). Fishermen who used fish traps or trap nets accounted for 28 per cent and those who used gillnets for 23 per cent.

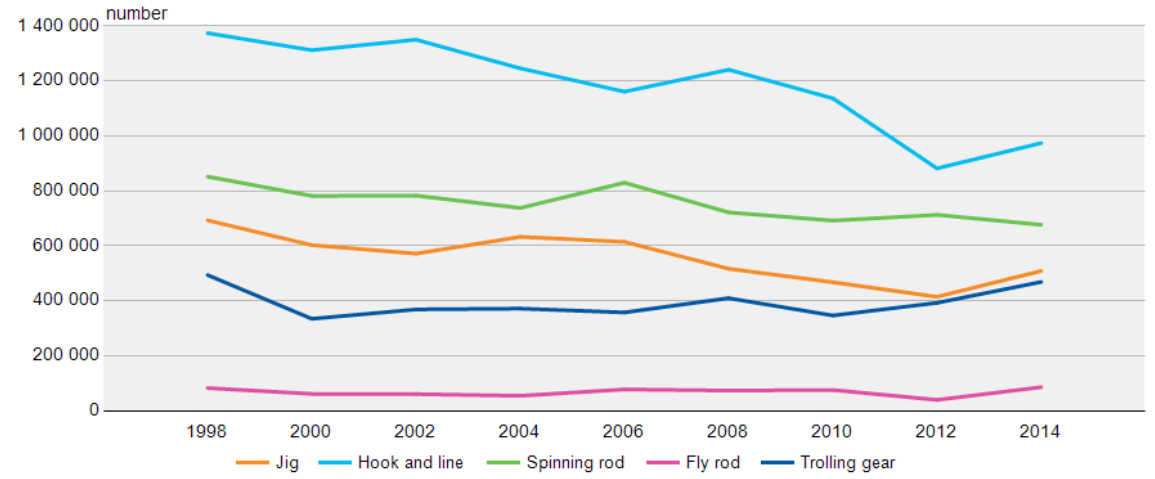
Compared to the year 2000, the number of fishermen who use a rod and line has decreased the most. The number of fishermen who use ice fishing rods and spinning rods has also decreased as the total number of fishermen has dropped. The number of people who engage in trolling, on the other hand, has grown slightly.

Trolling has increased among people aged over 45. The number of people under the age of 18 who engage in trolling has not changed since the beginning of the millennium, while trolling has decreased among people aged between 18 and 44. Gillnet fishing has only increased among people aged over 64.

Recreational fishing

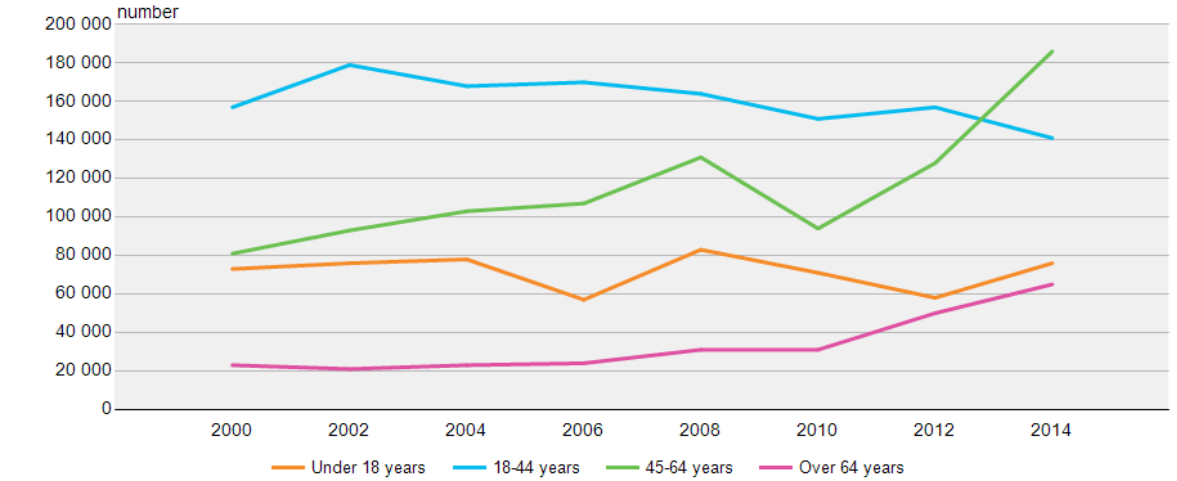
Number of persons using different gear types

Background data as a table



Number of fishermen using trolling gear by age group

Background data as a table



Aquaculture

Approximately 14.9 million kilograms of fish was grown for human consumption in Finland in 2015. The figure was approximately 1.4 million kilograms higher than during the previous year and close to the level of the early 2000s for the first time in years. However, the value of food fish production (EUR 55.6 million) did not change from the previous year due to lower producer prices.

In addition to food fish, approximately 50 million fish fry of different ages were cultured for stocking and further rearing. Food fish was grown on 162 fish farms and fry on 90 fish farms. A further 185 farmers grew fry in natural ponds.

Rainbow trout the most important species in fish farming

Rainbow trout is the most important species of fish farmed in Finland, and it was almost the only species farmed for food until the 2000s. A total of 13.9 million kilograms of rainbow trout and 0.8 million kilograms of European whitefish were produced in 2015. European whitefish appears to have established its place next to rainbow trout as a species farmed for human consumption. Other farmed species, such as brown trout, char and brook-trout, sturgeon, pikeperch, and grayling, amounted to a total of approximately 0.2 million kilograms.

More than 100 years of fish farming

Fish farming began in Finland just over 100 years ago. However, it was not until the late 1960s that fish farming developed into an industry thanks to rainbow trout. Initially, both fry and food fish were only cultured in inland raceways. Experiments involving the growing of rainbow trout in cages in the sea began in the early 1970s. Good experiences led to a rapid spread of the technique and a considerable increase in food fish production in the 1980s. Production volumes grew more than sixfold in the space of just over 10 years, peaking in 1991 with approximately 19.3 million kilograms. Production volumes fell again after the early 1990s and stabilised at between approximately 13 and 14 million kilograms by the beginning of the 21st century.

Fish farming is heavily regulated

Apart from minor fluctuations, there has been no notable increase in production volumes for years. The only significant change has been in the farmed species. Although fish farming is increasing rapidly around the world, Finland is still waiting for growth. Fish farming is heavily regulated by environmental permits, which is why it has not been possible to increase production volumes to any significant extent.

▶ Aquaculture

Food fish production (ungutted fish), 1978–2015

▶ Background data as a table

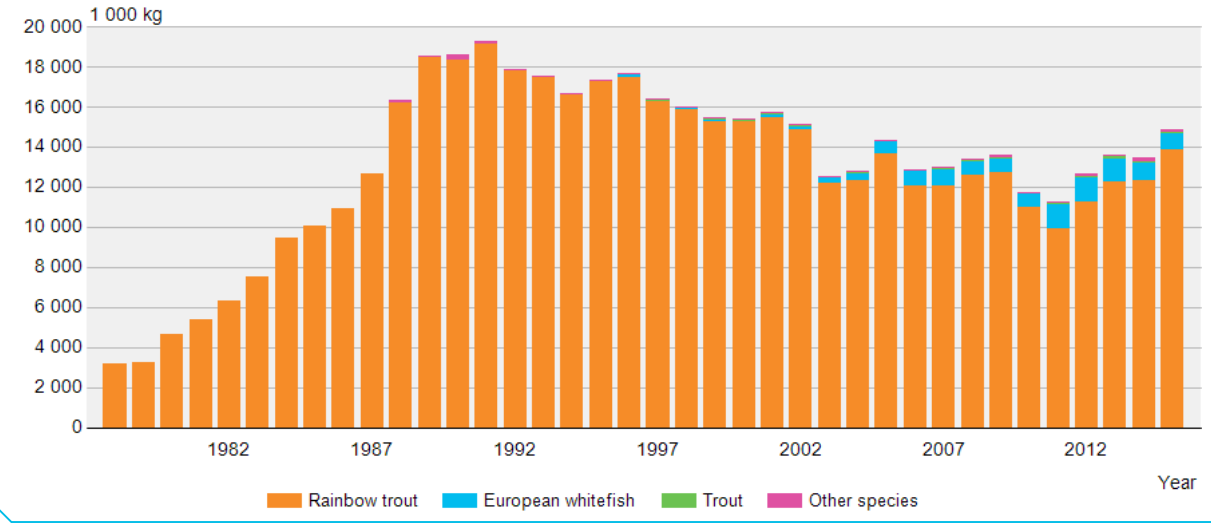
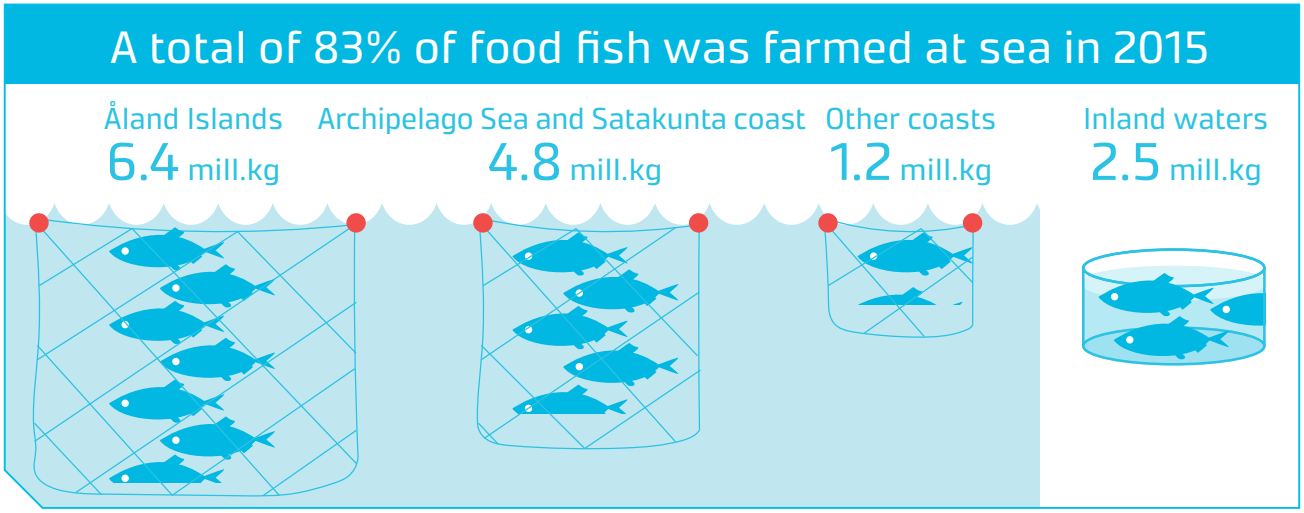


Photo: Luke's photo archive



Promising growth projections

The current growth projections are promising thanks to new techniques and growth targets. Offshore and recirculating aquaculture as well as nutrient cycling are believed to improve the status of the aquatic environment. This is hoped to relax the strict environmental permit procedure and therefore to enable fish farming on a considerably grander scale.

More room for growth offshore

Rainbow trout raising in cages offshore will continue to be the most important form of fish farming in the future as well. The ecological status of the sea can be improved by moving fish farms from the coast further offshore. The open sea provides an opportunity for building larger farms. Our northern location, such as the fact that the sea freezes over, remains a major challenge for offshore fish farming.

Recirculating aquaculture

Recirculating aquaculture farms, of which there are currently approximately 10, are found in inland nearby lakes and rivers. There are also a few new major recirculating aquaculture farm projects under way. Once completed, these farms are expected to add millions of kilograms to the total fish production volume.

From Baltic herring to rainbow trout

The animal feed industry has developed a product called the Baltic Sea feed, which recycles nutrients in fish farming. Nutrient levels in the sea are reduced by turning fish caught in the Baltic Sea, such as Baltic herring, into fish feed. This feed is used to grow domestic rainbow trout and European whitefish for human consumption.

Links to current debate and research relating to growth projections

- Commissioning of a test environment for recirculating aquaculture
- Baltic Sea feed from Finnish fish
- Blue bioeconomy produces Finnish sustainably cultured fish
- Fish farmers set their sights on offshore areas

Fish processing

A total of 46 million kilograms of all fish processed in 2015 was Finnish and 34 million kilograms was imported. The total volume, 80 million kilograms, was the same as in 2013, when statistics were last compiled.

Besides salmon, the most important species used by the processing industry were rainbow trout, Baltic herring, and European whitefish. These four species accounted for 97 per cent of all processed fish.

A total of 18 million kilograms of Finnish fish and 21 million kilograms of imported fish were filleted or turned into other fresh products. A total of 14 million kilograms of fish, three quarters of which was Finnish, was used to make other products.

Percentage of Finnish fish decreased

The percentage of Finnish fish decreased and the percentage of imported fish increased by comfortably more than 10 per cent compared to the year 2013. The change in the volume of Finnish fish was due to a decrease in the freezing of Baltic herring after exports to Russia died down in 2014.

Half of all Finnish fish was rainbow trout and almost as much was Baltic herring. Other domestic fish species only accounted for approximately five per cent in total.

Almost 60 per cent of all rainbow trout was turned into fillets or other fresh products. Almost one quarter was smoked or cold-smoked. Frozen products accounted for approximately 15 per cent.

Two thirds of all Baltic herring and sprat were frozen whole for the export market. Fresh fillets accounted for 14 per cent.

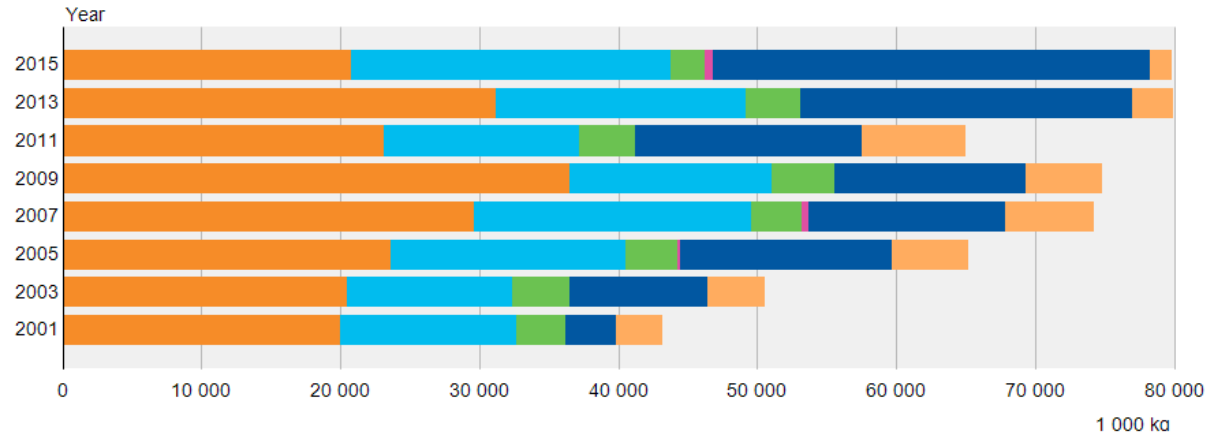
Of other domestic wild fish species, pikeperch, vendace, perch, pike, and salmon were processed the most. The total volume of processed fish amounted to approximately 1.7 million kilograms, of which 1.3 million kilograms was used for fresh products.

Fresh and frozen products from imported salmon

The increase in the volume of imported processed fish was due to an increase in the use of Norwegian salm-

Volume of fish used in fish processing by raw material weight

Background data as a table



on compared to the year 2013. Compared to the beginning of the millennium, the use of imported salmon has grown almost tenfold from approximately three million kilograms to approximately 30 million kilograms.

Fresh fillets are still the most important end product of imported salmon, and they account for half of the total volume of processed salmon. Compared to previous years, however, the percentages of other fresh products have grown considerably. Almost five million kilograms of gutted salmon was used to make other fresh products, compared to less than half a million kilograms in 2013. The amount of salmon used for frozen products has also grown more than tenfold compared to the year 2013.

Just over one million kilograms was turned into frozen fillets and approximately seven million kilograms into other frozen products. More than two million kilograms of salmon was turned into smoked and cold-smoked products.

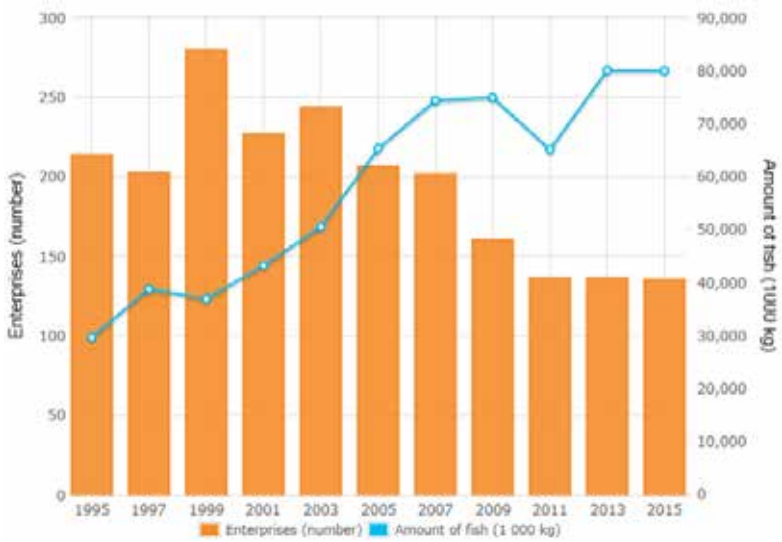
Fish processing becoming increasingly concentrated

Fish processing businesses numbered 135 in 2015, of which 24 processed more than half a million kilograms of fish. They processed 94 per cent of the total amount of processed fish.

▶ Fish processing

Photo: Luke's photo archive

Number of fish processing enterprises and volume of processed fish



▶ Background data as a table

Producer prices for fish

Fishermen were paid less for Baltic herring, the most abundant species in Finland's commercial fishing catch, in 2015 than during the previous year. The producer prices for other species of fish landed in Finnish seaports increased slightly. Pikeperch, the most valued saltwater fish species, fetched approximately EUR 1 more per kilogram than the second most valued species, brown trout.

Prices for Baltic herring sold to the industrial sector fell in 2015

The majority of Finland's Baltic herring catch is sold to the animal feed industry. The percentage of Baltic herring sold to the industrial sector grew in 2015, while prices fell by approximately 20 per cent. The price paid for Baltic herring sold to human consumption remained at the previous year's level.

Fish prices depend on the size and quality of the fish, which in turn affect how the fish is used. The picture shows the producer prices paid for Baltic herring sold to the industrial sector and for human consumption in 2015, excluding value-added tax.

Producer prices for fish have increased in the 21st century

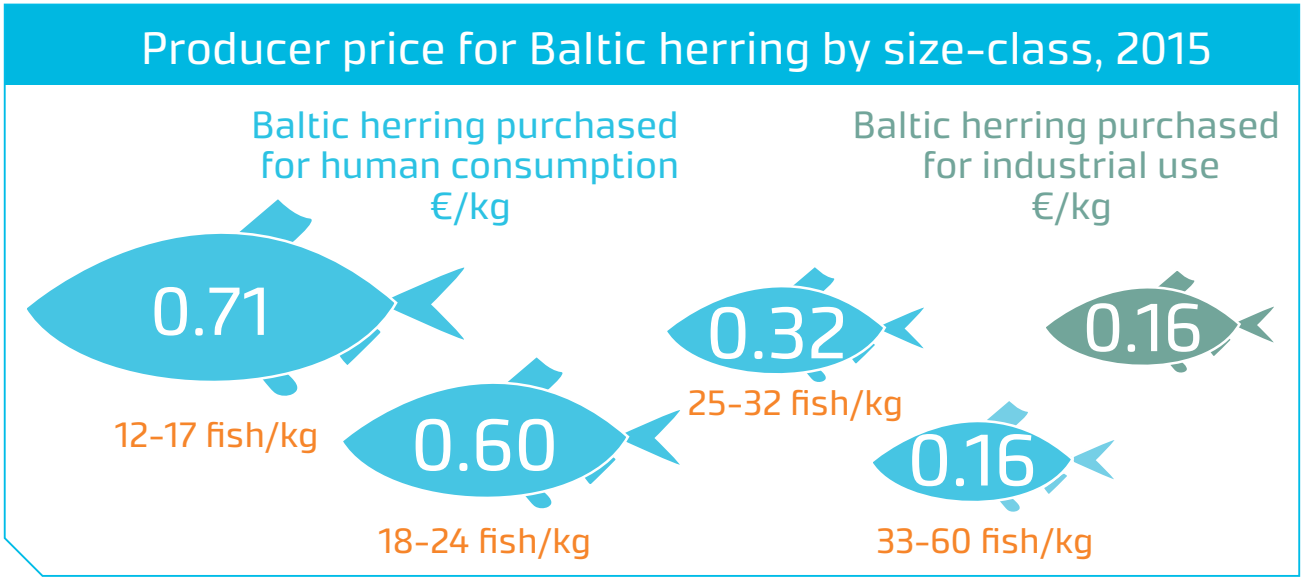
There was less variation in the producer prices for white fish in the 1990s than in the 2000s. However, the producer prices for several species of fish dropped when Finland joined the EU in 1995. The producer prices for pikeperch, European whitefish, and burbot in particular have risen both nominally and in real terms after the year 2000.

The price subsidies paid between 1975 and 1994 influenced the producer price for Baltic herring in the past. The abolishment of price subsidies as a result of Finland's accession to the EU decreased the average prices paid to fishermen for Baltic herring sold for human consumption considerably. Fishermen were paid an average of EUR 0.27 per kilogram for Baltic herring sold for human consumption in 2015.

Prices for pink fish have fallen

Back in the 1970s, salmon was a highly valued fish, and its producer price reflected this. The producer price for salmon dropped in the 1980s, when rainbow trout hit the markets, and again in the 1990s, when Norwegian farmed salmon began to dominate fish counters. Finland's EU membership caused prices to drop sharply in 1995. Prices for pink fish remained close to each other throughout the 1990s, but the price of salmon in particular has fluctuated considerably since then. Fishermen were paid an average of EUR 4.43 per kilogram for salmon in 2015.

Producer price for Baltic herring by size-class, 2015



Farmed European whitefish more valuable than farmed brown trout

European whitefish has been raised for human consumption in Finland since the mid-1990s, but the volume of European whitefish farmed in Finland is still only a fraction of the volume of rainbow trout. The average producer price for farmed European whitefish grew on the previous year by approximately 10 per cent in 2015, while the price of rainbow trout fell by the same amount. The average producer price for European whitefish was EUR 9.46 per kilogram and that of rainbow trout EUR 3.59 per kilogram.

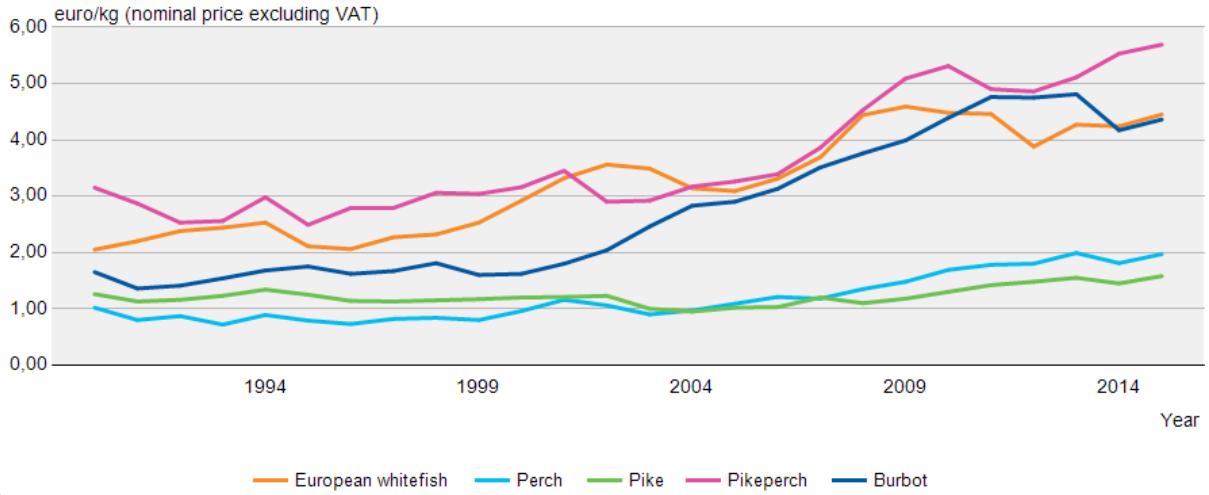
Prices are reported by wholesalers

The average prices for Baltic herring, sprat, and salmon have been calculated on the basis of information reported by first-hand buyers to Centres for Economic Development, Transport and the Environment. The average prices for other species caught at sea as well as for vendace caught in lakes and rivers are based on a sample of prices reported by businesses that buy fish. The prices for farmed fish are based on information compiled by the Finnish Fish Farmers' Association. Prior to the year 1989, all information on fish prices was collected from fishermen.

▶ Producer prices for fish

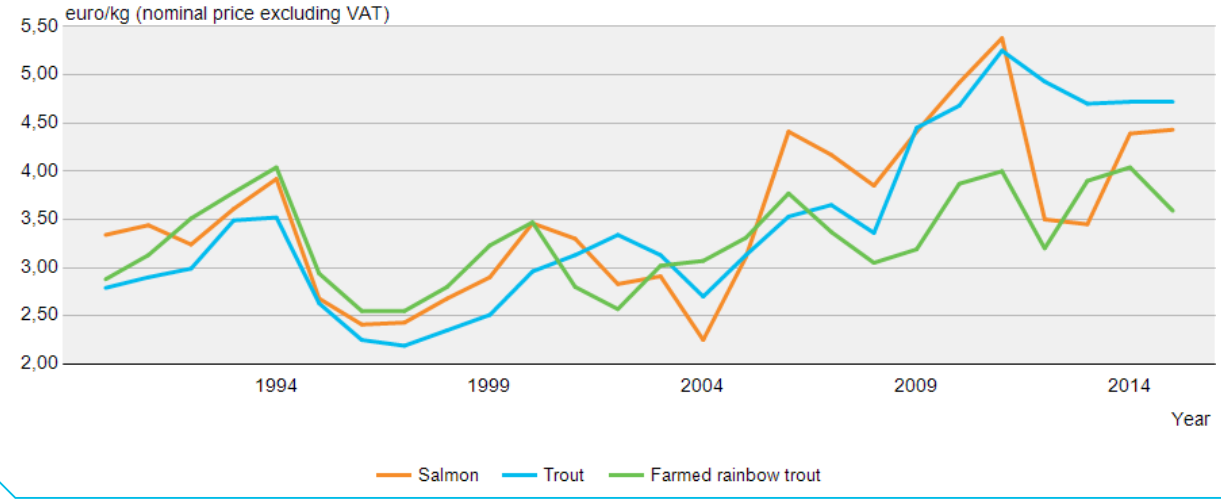
Producer prices for European whitefish, perch, pike, pikeperch, and burbot, 1990–2015

▶ Background data as a table
▶ Prices in real terms



Producer prices for salmon, trout, and rainbow trout in 1990–2015

▶ Background data as a table
▶ Prices in real terms



Foreign trade in fish

A total of 112 million kilograms of fish and fish products were imported to Finland in 2015. The total value of imports was EUR 374 million. Products intended for human consumption accounted for two thirds of the imported volume (72 million kilograms) and for just over 90 per cent of the value (EUR 340 million).

Finland exports considerably less fish than it imports. Fish and fish product exports amounted to 69 million kilograms in 2015, and the value of exports was EUR 38 million. Fish intended for human consumption accounted for approximately 70 per cent of the total volume. The volume of exports grew by three million kilograms in total, and the volume of imports fell by four million kilograms on the previous year.

Norwegian salmon the most important import

Just under half (33 million kilograms) of all fish and fish products imported for human consumption originated in Norway. The most important product was fresh, whole Atlantic salmon (29 million kilograms). Rainbow trout was primarily imported from Sweden: approximately nine million kilograms in 2015.

Various kinds of fish products and tinned fish were also a major product group, and the value of imported fish products and tinned fish amounted to EUR 72 million. More than half of the value was attributable to tinned tuna, which mostly originated in Thailand and Mauritius. The value of various kinds of frozen imports, the most important of which were salmon and brown trout as well as different kinds of frozen pollock products, amounted to approximately EUR 28 million.

Imports have increased

The importing of fish for human consumption has approximately doubled in just over 10 years, although the volume of food products imported in 2015 was five million kilograms and their value EUR 21 million lower than during the previous year.

The most important products imported for other purposes (40 million kilograms) mostly consisted of fish waste from Norway and fishmeal from Iceland, Denmark, and Norway.

Estonia and Denmark the most important export destinations

By monetary value, the most important export destinations for fish and fish products in 2015 were Estonia (EUR 18 million) and Denmark (EUR 11 million). The fish exported to Estonia consisted of approximately two thirds of frozen Baltic herring and a small amount of fresh sprat, and just under one third of fresh rainbow trout and oth-

Photo: Ville Vähä / Luke

er salmonid products. Denmark accounted for approximately 70 per cent of the total volume of exported fish.

Some of the Baltic herring exported to Denmark ends up as fish feed

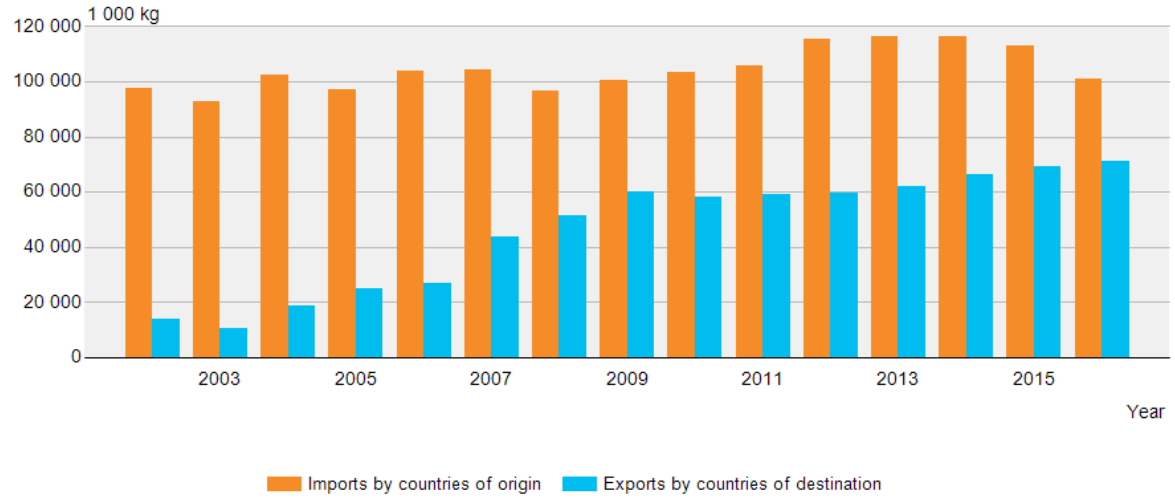
A total of 24 million kilograms of fresh whole Baltic herring and sprat were exported to Denmark to be used for human consumption, accounting for approximately half of all fish exported to Denmark. The figure was more than three million kilograms higher than during the previous year. Finland also exported almost five million kilograms of frozen whole Baltic herring and 20 million kilograms of fish feed to Denmark. Statistics on trade within the internal market are unreliable especially with regard to the purposes for which fish products are used. It is likely that much of the Baltic herring and sprat exported to Denmark end up as fish feed. No frozen whole Baltic herring and sprat were exported to Russia, while the volume in 2014 was more than 10 million kilograms.

The exporting of fish and fish products has grown fivefold in the space of approximately 10 years.

▶ Foreign trade in fish

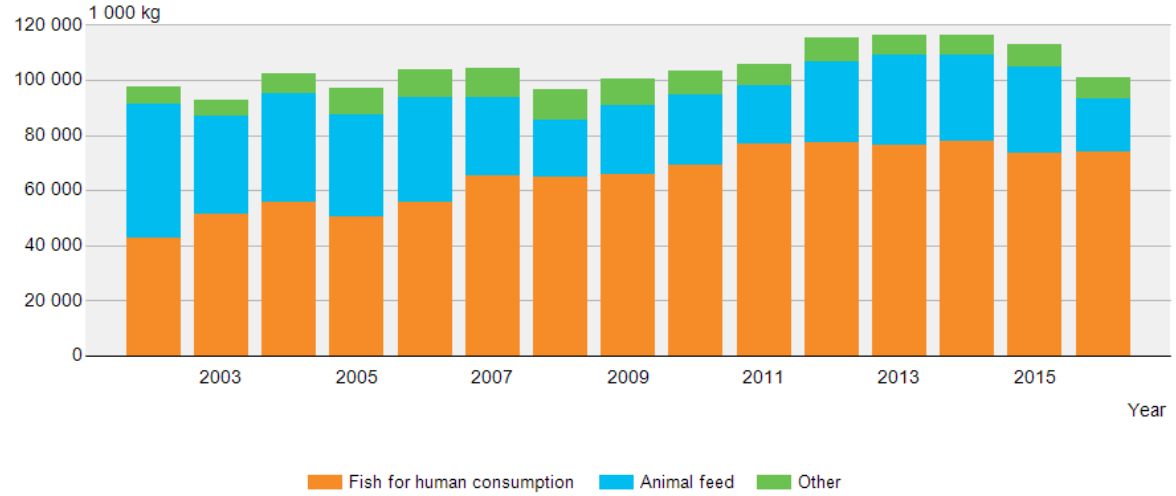
Imports and exports of fish and fish products by volume

▶ Background data as a table



Imports of fish and fish products by intended use

▶ Background data as a table



Profitability of fisheries

In 2014, the total income of the 1,789 fishery businesses in Finland amounted to EUR 957 million. The overall value added by the fishery industry was EUR 153 million, and the businesses provided employment equivalent to 2,827 person-years. Fishing companies accounted for 72 per cent of all fishery businesses. The fishery sector with the highest revenue was fish processing. Fish processing businesses also employed the most people.

The fishery industry is highly concentrated

There were a total of 1,789 fishery businesses in Finland in 2014. The majority (72 per cent) of the businesses in the industry were fishing companies. The total income of the fishery sector amounted to EUR 957 million, which was three per cent more than in 2013. The fishery sector's total value added was EUR 153 million. Fish trade and processing are highly concentrated, but fishing and aquaculture have also become more concentrated in recent years

Fish processing provided the most employment

The fishery industry provided employment equivalent to 2,827 person-years. The largest employer was the fish processing sector, which accounted for 38 per cent of the whole industry. Fishing accounted for 12 per cent, aquaculture for 12 per cent, and fish trade for 38 per cent. The number of person-years decreased in primary production and increased in fish processing and wholesale trade.

Fish trade revenue on the rise

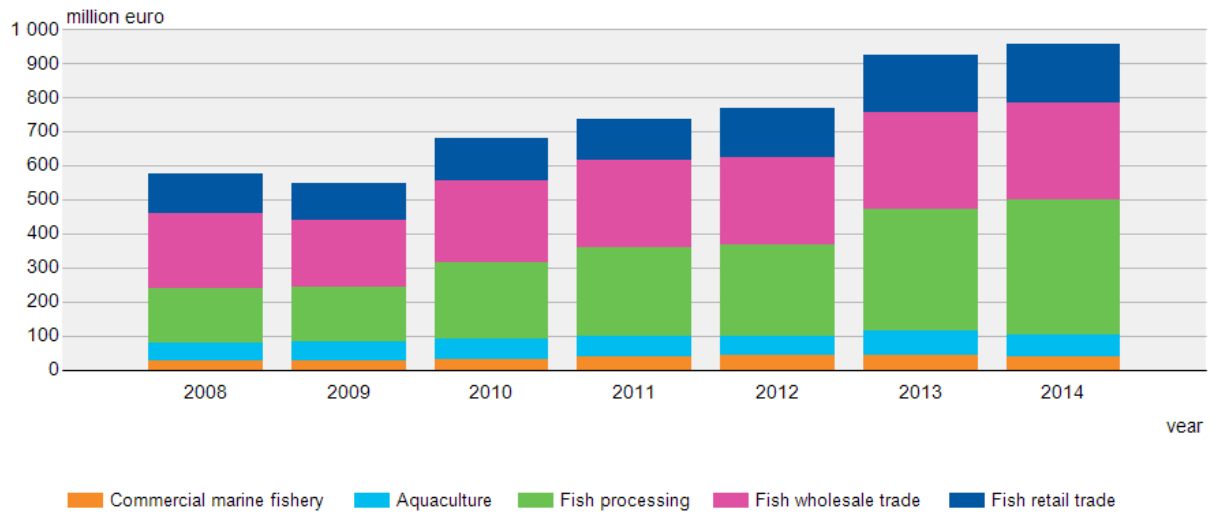
The fishery industry's revenue increased in 2014. Fishing revenue decreased and net profit fell with the exception of the biggest coastal fishing companies. The revenues of aquaculture businesses fell, but the sector's profitability improved. The net profit of wholesalers decreased, although revenue matched the 2013 level. Fish processing revenue increased by 10 per cent, but net profit fell regardless. The profitability of retailers specialising in fish decreased, but they made a positive result. The revenue of fish processing businesses exceeded the revenues of both wholesalers and retailers. Fish trade revenue continued to increase.

Net profit from fishing decreased

In 2014, there were 1,295 marine fishing companies in Finland. The majority of fishing companies are engaged

Total nominal income of commercial marine fisheries, aquaculture, fish processing, fish wholesale and fish retail

Background data as a table



in coastal fishing. A total of 68 per cent of all fishermen were coastal fishermen with an annual turnover of less than EUR 8,500.

The total annual revenue of fishing companies in 2014 amounted to EUR 40 million. The revenues of small-scale coastal fishermen and large trawlers decreased, while the revenues of larger coastal fishing companies and small trawlers increased. The decline in the exporting of Baltic herring and sprat to Russia in 2014 had a negative impact on the revenues of large trawlers.

Net profit from fishing decreased, and coastal fishermen with a turnover of more than EUR 8,500 had the highest profits. Small trawlers also made a net profit. Small-scale coastal fishermen and larger trawlers made a loss in 2014. Fishermen's net investments in 2014 amounted to a total of approximately EUR 10 million. Small trawlers (EUR 5 million) and large coastal fishing companies (EUR 4 million) had the highest net investments. With the exception of large trawlers, the solvency of fishing companies was good and their liquidity satisfactory.

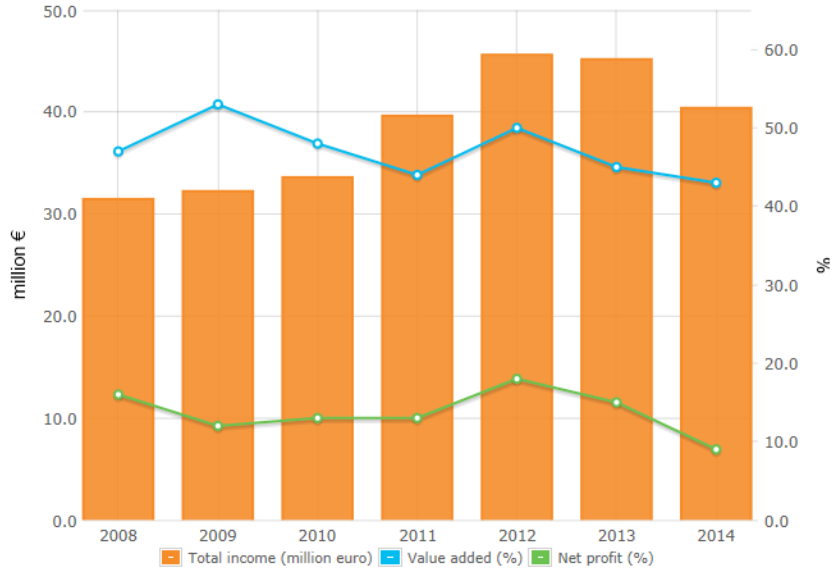
▶ Profitability of fishery

▶ EconomyDoctor

Photo: Erno Salonen / Luke

Nominal development of total income, value added and net profit of marine fishing companies

▶ Background data as a table



Fish consumption

Finns consumed the equivalent of just over four kilograms of filleted Finnish fish per capita in 2015. Imported fish consumption amounted to approximately 10 kilograms. Total fish consumption decreased slightly on the previous year.

The most consumed domestic fish species was rainbow trout (1.3 kilograms), and the most consumed foreign fish species was farmed salmon. Foreign salmon consumption equalled the total amount of all domestic fish species (4.1 kilograms).

Of domestic wild fish species, vendace was consumed the most (0.58 kilograms). The next most consumed species were perch and pike (0.45 kilograms), pikeperch (0.34 kilograms), Baltic herring (0.30 kilograms), and European whitefish (0.24 kilograms).

One third of all Finnish fish used for human consumption was farmed and one quarter was caught by professional fishermen. Recreational fishermen accounted for 42 per cent.

Consumption of Finnish fish has decreased and that of Norwegian salmon has increased

The consumption of Finnish fish has dropped by approximately one third in the 21st century. Of all domestic species, only the consumption of pikeperch has increased since the beginning of the new millennium.

As the consumption of Finnish fish has decreased, the volume of imported fish has almost doubled, and the consumption of salmon imported from Norway has quadrupled.

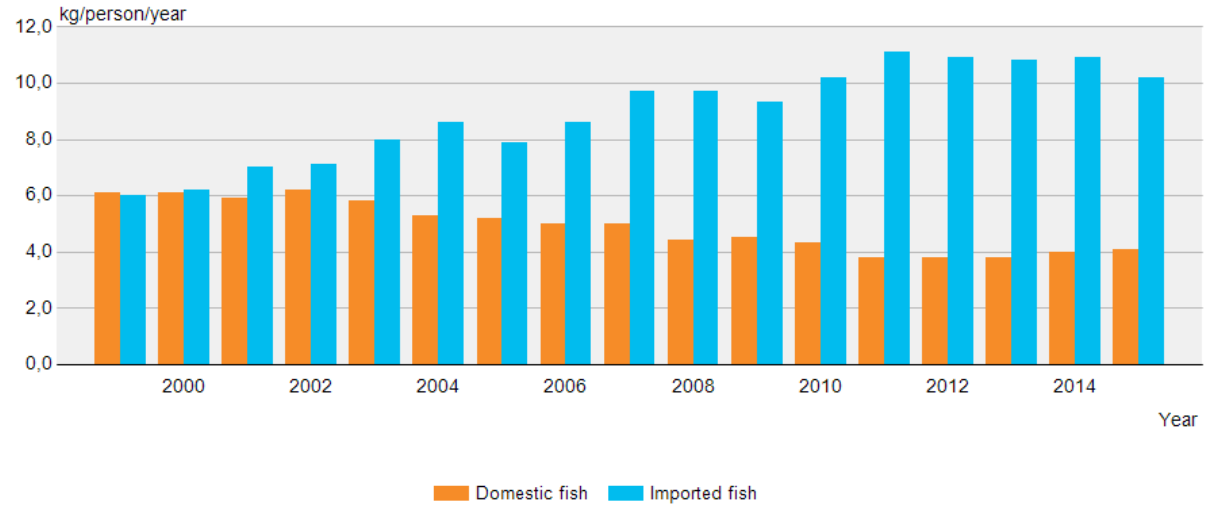
After Norwegian farmed salmon, the most consumed imported products were tinned tuna and tuna products, farmed rainbow trout, frozen pollock, as well as prawns and prawn products.

Foreign salmon consumption equalled the total amount of all Finnish fish species.

▶ Fish consumption

Use of fish for food

▶ Background data as a table



Hunting

Approximately 300,000 hunters pay the game management fee each year and are therefore entitled to hunt game. The number of hunters decreased in 2015 on the previous year. The hunting bag also decreased, and the grouse and waterfowl bag in particular fell on the previous year.

The number of hunters has remained unchanged for a long time

The number of hunters has hardly changed since the 1980s, but the figure has fallen in the last few years. Exact information on the number of hunters is available since the 1930s, as the game management fee was made a mandatory requirement for hunters in the 1934 Hunting Act.

National game statistics have been compiled for decades

National small game statistics have been compiled annually since the first half of the 20th century, and almost completely continuous statistics exist since the 1960s. The number of game species included in statistics has increased over the years. The name of the statistics was changed to hunting statistics in 2008, and since that time data have also been compiled on the number of hunters and the kinds of game animals they hunt in addition to game volumes.

Game data gathering and analysis techniques have changed

Data gathering techniques have varied and calculation techniques developed over the years. This is why figures from decades ago are not directly commensurate with recent ones. The current techniques have been used since 1996.

Before 1995, game statistics were based on the hunting year (1 August – 31 July), but a calendar year has been used as the basis for game data since 1996.

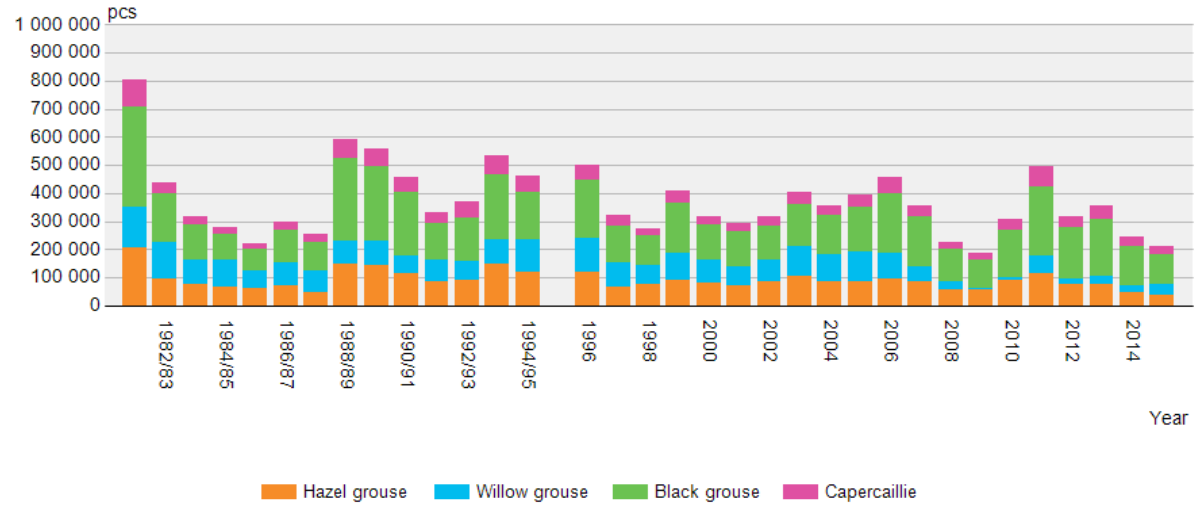
The statistics are based on annual surveys which are sent out to at least 300 hunters who paid the game management fee during each calendar year in each game management district, i.e. administrative sectors of the Finnish Wildlife Agency.

Game volumes have fluctuated

Of mammals, the alpine hare bag plummeted at the turn of the millennium. Muskrat was still hunted in large numbers in the 1970s, but the bag declined in the 1980s. Of small carnivores, the raccoon dog bag has grown stead-

Grouse bag during the hunting years of 1981/1982–1994/1995 and during the calendar years of 1996–2015

Background data as a table



ily since the 1980s, while the mink bag has halved during the 21st century. All three of the most recently mentioned species spread or were introduced to Finland during the first half of the previous century.

Of waterfowl, the mallard bag has varied between 200,000 and 300,000 during the last approximately 20 years, and no change in either direction can be discerned. Of Finland's other abundant waterfowl species, both the teal bag and the goldeneye bag have decreased steadily during the same period.

Grouse numbers fluctuate naturally at intervals of between approximately six and seven years. The grouse bag was high at the beginning and end of the 1980s, while good years in the 21st century so far have been the year 2006 and especially the year 2011. The grouse bag is low at the moment.

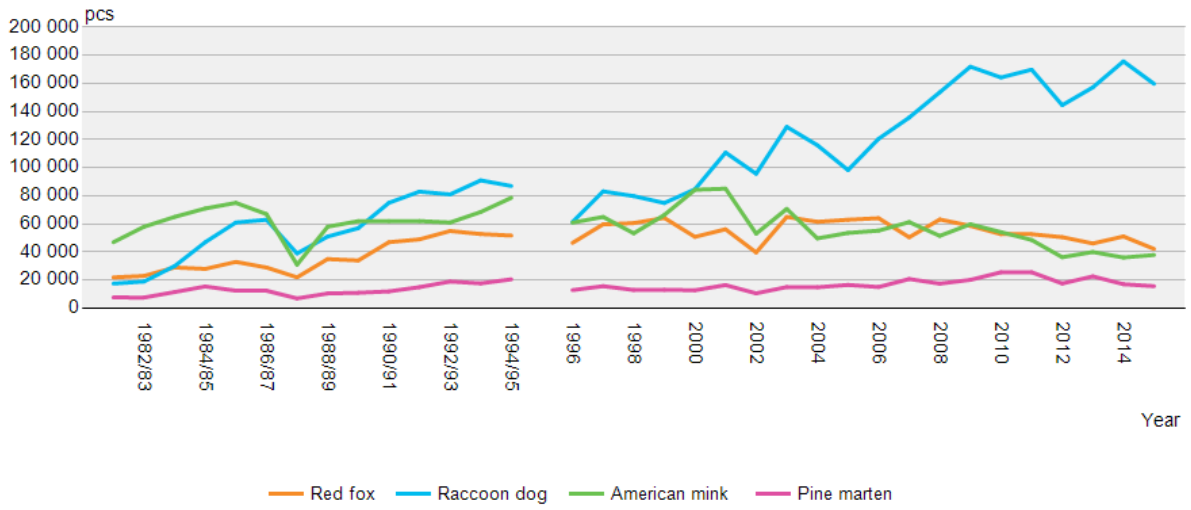
Statistics on the number of small game hunters have been compiled since 2008

Grouse are hunted by at least 100,000 hunters. The highest number of grouse hunters recorded in the last six years was 140,000. When grouse numbers are low, there are also fewer hunters. Waterfowl were hunted by 85,000 hunters in 2015, and the figure was approximately 20,000 less than during the peak year. Small game hunters have numbered between 170,000 and 200,000 all in all in recent years.

▶ Hunting

Bag of the four most common small carnivores during the hunting years of 1981/1982–1994/1995 and during the calendar years of 1996–2015

▶ Background data as a table



A total of approximately 3.5 million days of hunting in a year

Links to statistical services

Luke's statistical services: *http://stat.luke.fi/en/uusi-etusivu*

Luke's statistics database: *http://statdb.luke.fi/PXWeb/pxweb/en/Luke/?rxid=4bc106d9-8a7f-4959-96e1-85ded18f7715*

Instructions on using the database: *http://stat.luke.fi/sites/default/files/tilastotietokanta_ohje_evuosikirja.pdf*

Statistics Finland: *http://stat.fi/til/index_en.html*

FAOSTAT statistical database: *http://faostat3.fao.org*

Eurostat database: *http://ec.europa.eu/eurostat/data/database*

Agricultural statistics of Sweden: *http://www.jordbruksverket.se/omjordbruksverket/statistik.4.67e843d911ff9f551db80003060.html*

Global Forest Resources Assessment 2015 – Country Reports: *http://www.fao.org/forest-resources-assessment/documents/en/*

State of Europe's Forests 2015 Report: *http://www.foresteurope.org/*

FAO Forestry Statistics: *http://www.fao.org/forestry/46203/en/*

UNECE Forestry and Timber: *http://www.unece.org/forests/welcome.html*

Forest statistics of Sweden: *https://www.skogsstyrelsen.se/statistik/*

Photo: Luke's photo archive

Thematic research programmes of the Natural Resources Institute Finland

More information: www.luke.fi/en/

Boreal Green Bioeconomy

The objective is to secure a stable, growing raw-material resource based on forest and field biomass, advance the flexible planning of its use, and create efficient supply chains for the needs of various customer groups.

Blue Bioeconomy

The objective is to develop water-based bioeconomy across the value chain. Our operation will contribute to building an entity that will make more diverse use of water resources and water ecosystems in a sustainable manner.

Innovative Food System

The objective is to improve the competitiveness of food production and increase food exports. Research will improve food and nutrition safety and the circular economy in food production, and will also promote the following: consumer well-being through sustainably produced food, the development of the food system with a consumer focus, and the use of new technologies and digital solutions in food production.

BioSociety

The objective is to study and promote the realisation of the natural resources economy and the required changes in society. Research will influence the formation of policies for the sustainable and acceptable use of renewable natural resources, the functioning of the markets, the promotion of the spread of new technologies and business models in society, and practices that will ensure balanced societal and regional development.

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