



Research priorities in the Finnish organic food and farming sector in 2025-2030

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Introduction

The ambitious growth targets for production, consumption and exports by 2030 for Finland’s organic sector are described in the National Programme for Organic Production (Ministry of Agriculture and Forestry 2023a, b) (Figure 1). Research-based information to support the development of production and to provide consumers with verification of the added value of organic production is needed to achieve these targets. Additionally, information about the role of organic production in a more sustainable food systems is also needed. This publication aims to describe the *Finnish organic food and farming sector’s research priorities for 2025–2030*.

Scarcity of research funding, challenges in the sustainability of the food system and the ambitious growth targets set in the organic sector all necessitate identification of research priorities. From the perspective of organic business, research resources should be directed to the central questions for development of organic production in Finland and with a consideration for internationally high-quality research. Finnish research of organic production also addresses global research questions and information needs. It supports the transition of all agricultural production towards more sustainable and ethical production methods.

These research priorities have been prepared in close cooperation with members of the organic food and farming sector. An online survey was conducted in early 2024, which was responded to by 37 representatives of organic companies, farmers, advisors, researchers, the authorities and the organic sector’s other members.



Figure 1. Organic 2.0 – Objectives of Finland’s National Programme for Organic Production by 2030 (MMM 2023a,b). Field photo: Sari Iivonen. Public food services photo: EkoCentria/Tero Takalo-Eskola. Rainbow trout photo: Wikimedia Commons. Other photos: Envato.

Three workshops were held in spring 2024, the first at the Organic Forum in Kouvola, the second as a virtual workshop for researchers, and the third as a workshop for organic farmers in cooperation with the Finnish Organic Association. Approximately 80 people participated in the workshops, which focused on: research needs for sustainable organic crop and livestock production, organic food processing, the organic markets, and the food system level research questions more broadly. The authors of this report reviewed all the data collected and summarised the research needs identified on the basis of the data in this report. The authors incorporated valuable feedback from both participants in the survey and workshops, as well as members of the monitoring group for the implementation of the National Programme for Organic Production in preparation of this publication.

Organic 2.0 – Finland’s National Programme for Organic Production 2030 and its implementation plan states that the research for organic production should support the sector and communicate research-based information to consumers (Ministry of Agriculture and Forestry 2023a, b). Research is needed to support development of the organic production certification system and to strengthen consumer capacity for informed decision-making through increased awareness of the obligations and methods inherent to organic production. Consideration of local contexts in the development of solutions and close cooperation with all parties to the organic food chain are essential elements for organic research. Comprehensive planning of the entire production system is needed in organic primary production to ensure that nutrient recycling is effective and ecological crop protection can succeed. Production necessitates systems thinking and ecological innovation based on solid expertise.



Photo: Kai Widell

What does organic production and research mean?

Organic production is based on the four principles put forth by the International Federation of Organic Agricultural Movements (IFOAM) (2024). These are: health, ecology, fairness and care (Figure 2). The aim is production of sufficient amounts of high-quality food that is fairly produced and takes into account the welfare of people, livestock, crops and the environment. In Finland, Rajala (2006) has listed the principles of organic production.



Figure 2. Ecological, social and financial sustainability form the philosophical basis of organic production. This overall sustainability is based on four main principles: health, ecology, fairness and care. Health photo: Hanna Koikkalainen. Ecology photo: Marjo Hokka. Fairness and Care photos: Envato.

Principles of organic production (Rajala 2006)

Recycling principle

Nutrient recycling is emphasised, and nutrient cycles are to be as closed as possible. Nutrients are recycled via the ecosystem's own processes.

Precautionary principle

Methods proven to be safe are used. Technologies foreign to natural processes are adopted with caution, and their risks and adverse impact should be identified before being introduced.

Proximity principle

The food chain should be transparent and there should be cooperation amongst the parties. The production inputs should be locally sourced and consumption should occur as close to production as possible.

The legal basis for Finnish organic production is EU regulation (EU2018/848) on organic production and labelling of organic products, which states, "*organic production is an overall system of farm management and food production that combines best environmental and climate action practices, a high level of biodiversity, the preservation of natural resources and the application of high animal welfare standards and high production standards in line with the demand of a growing number of consumers for products produced using natural substances and processes.*"

Organic production differs from conventional agricultural production in that it is based on the production rules laid down in the EU regulation on organic production and labelling of organic products, which support the four principles presented in Figure 2. In Finland, organic producers are committed to adhering to the monitoring of organic production as coordinated by the Finnish Food Authority, and they can use the EU organic label in their products. For example, the rules for organic production forbid the use of synthetic crop protection agents and inorganic fertilisers. Additionally, animal welfare is at the core of organic livestock production. Strict restrictions are in place for the use of additives, processing aids, and chemically produced synthetic raw materials, in processing of organic foods.

Overview of organic production in Finland and changes in the operating environment

Organic production grew significantly throughout the past decade. Organic production accounted for an average of 7.5% of the total arable field area in Finland in 2010 and as much as 15.0% in the peak year of 2022. After several years of growth, the area under organic arable production began a downward trend in 2023 when it comprised only 13.7% of the total arable area. In 2023, the area under organic arable production and in conversion to organic production totalled 310,719 hectares (Figure 3). Preliminary data for 2024 indicates that the area under organic production is increasing, with a total arable area of 14.1%.

In 2023, Finland had 4,236 organic producers, 401 processing companies in the organic monitoring register (encompassing 342 processing plants, 25 slaughterhouses and 34 feed companies), 40 companies with exports of organic products, and 55 companies engaged in the import of organic products (Finnish Food Authority 2024a; ProLuomu personal communication).

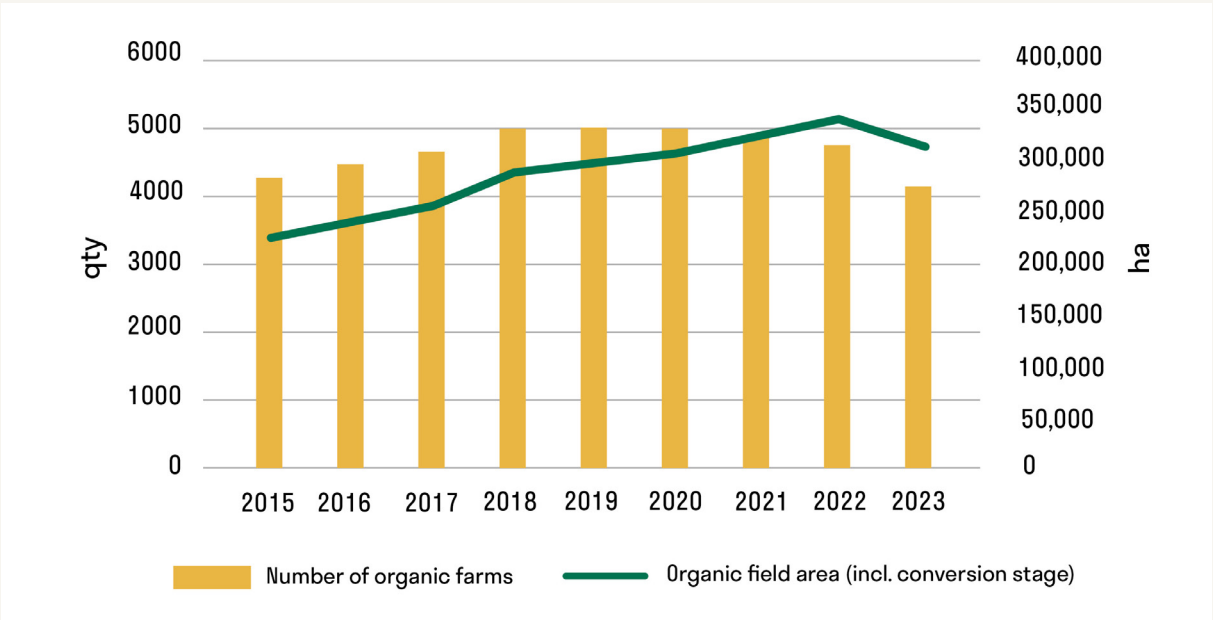


Figure 3. Number of organic farms and organic arable area (including fields under conversion to organic) in 2015–2023. Source: Finnish Food Authority 2024a.

The number of organic farms decreased in Finland especially in 2022 and 2023 (Finnish Food Authority 2024a; Figure 3). In 2022, organic farms accounted for 11.1% of all active farms in Finland, with the corresponding figure being 9.8% in 2023. However, the average size of organic farms has grown steadily in Finland, increasing from 43.4 ha in 2010 to 75 hectares in 2023. The average size of all Finnish farms was 53 hectares in 2023. Thus, organic farms in Finland are, on average, larger than the average Finnish farm.

The production of organic crops is highly grassland-dominated, as grassland production accounts for 54% of the total organic arable harvest area (Luke 2024a). Northern Ostrobothnia has both the highest percentage of grasslands (approximately 67%) as the total of its certified organic production, as well as the highest area of organic production area as measured in hectares (Finnish Food Authority 2024b). In addition to grasslands, Northern Ostrobothnia produces barley and, secondly, oats. The reason is that the region's focus is in cattle production.

According to preliminary data for 2024, the organic cereal harvest comprised 4% of the total cereal harvest, totalling 143 million kilos. Oats accounted for more than half of the organic cereal harvest at 91 million kilos. This was followed by organic barley at 15 million kilos. Organic oats accounted for 8% and organic rye for 10% of total production in Finland, respectively. In addition, the organic pea harvest was 12 million kilos and the organic broadbean harvest 2.4 million kilos. Organic broad beans accounted for roughly 18% and organic peas for 12% of the total harvest (Luke 2024b). The production of wheat, rye and pea is focused on Southwest Finland, which has the second highest area under certified organic production in the country (Finnish Food Authority 2024c).

In 2023, organic vegetable production in Finland covered 1,085 hectares, or 10.3% of the total area of field-grown vegetable crops. Finland's organic fruit production area was 61 hectares, which accounted for 8% of the total area in fruit production. Organic greenhouse production is a very small-scale activity at only less than 10 hectares.



Photo: Emil Mäntynen

Organic livestock production is strongly concentrated on organic ruminants: dairy cattle, suckler cows and sheep (Figure 4). Egg production makes up the largest part of organic poultry production. Organic pork and chicken meat production has been a very small-scale activity. In 2023, organic livestock farms numbered 1,039. There were 9,036 organic dairy cows (3.7% of the total number of dairy cattle), 8,377 cattle (8.4%), and 28,014 suckler cows (43.4%). Organic sheep numbered 25,138, or 20.7% of all sheep. The average number of cows on the organic dairy farms included in production monitoring by ProAgria was 79.6, whereas the corresponding figure on all monitored farms was 59.6 (ProAgria production monitoring 2024). The size of dairy farms has increased, and their number has decreased. This corresponds to the trend in conventional production. While organic hens accounted for 6% of all laying hens, the percentage of organic pigs and chickens were well below 1%.

In 2023, 7,3% (5,086) of all honey beehives were organic beehives. Compared to the previous year, the number of beehives increased by 10% (Finnish Food Authority 2024d), whereas that of organic beekeeping farmers decreased by 5%.

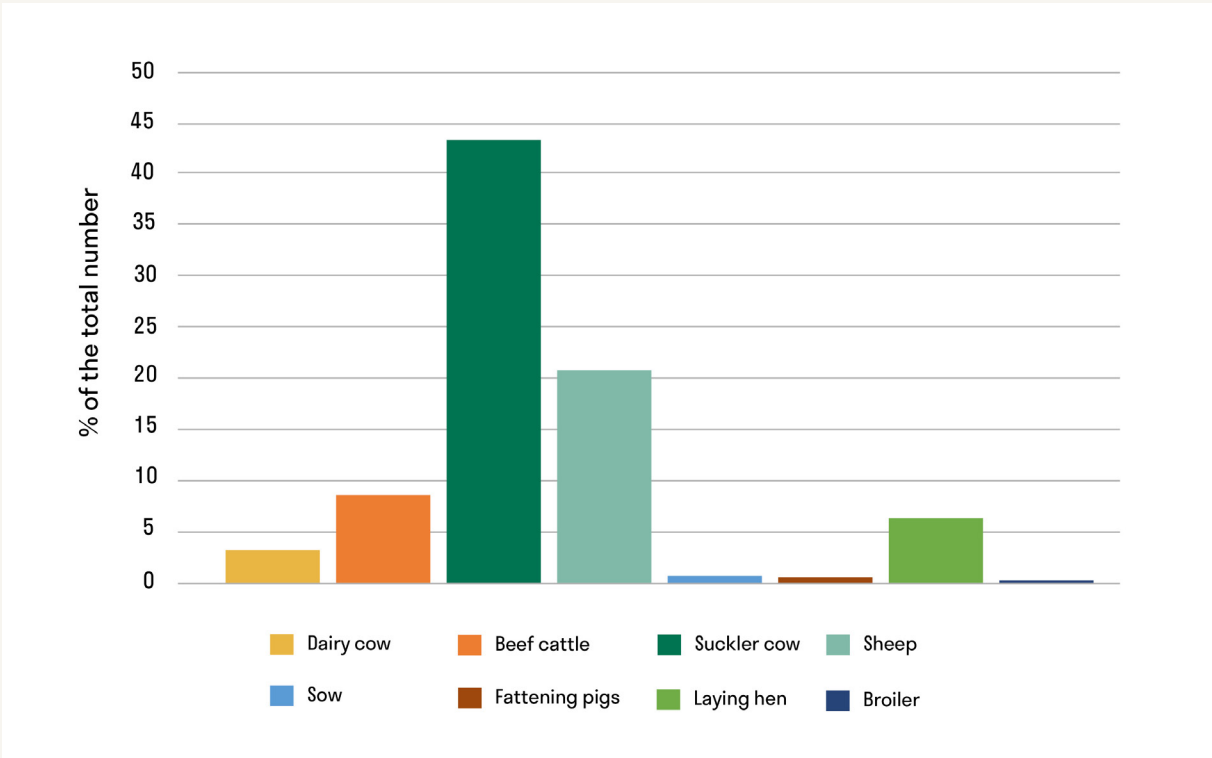


Figure 4. Percentage of organic livestock, percent of the total size of the livestock group, 2023. Source: Luke 2024b, Finnish Food Authority 2024c.



In 2023, 6.9 million hectares of Finland's forest areas were certified as collection areas for wild organic products. Most collection areas certified for organic wild collection were in Lapland. The most commercially significant organic wildharvested products are bilberry, lingonberry and cloudberry (ProLuomu 2024).

The number of individuals in Finland purchasing organic products monthly numbered 2.3 million in 2023, up by more than 100,000 from 2021 and by as much as 660,000 from 2010. Organic products are purchased at least weekly by 30% of Finnish people, who can be considered active consumers of organic products (Kantar 2023). The market share of organic products considering the value of food sales in grocery trade increased throughout the last decade in Finland, while consumption started to decrease in 2021. In 2024, organic products accounted for 1.8% of the value of groceries purchased by Finnish people (ProLuomu 2025). The use of organic products in the public procurement has increased, and this sector is viewed as particularly significant for the development of organic production (Report on the use of organic products in public food services 2024).

The previous decade was characterised by a significant increase in Finnish organic production. The beginning of this decade from 2020 can be described as challenging. The coronavirus pandemic, the war in Ukraine, and the general increase in living expenses and financial uncertainties are reflected in consumer confidence and pur-

chasing power. This impact on the organic sector is evident in decreased consumption of organic products and loss of market share in consumer grocery purchases. The changes brought along by the new EU regulation on organic production, the increase in certification costs especially on smaller farms, and changes in agricultural support policy and legislation have impacted farmers' livelihoods and reduced the profitability of organic production.

Changes in the requirement for market crops have caused discussion among organic farmers. According to the new requirements, 30% of the area under certified organic production must be, in any given year, dedicated to market crops production (Finnish Food Authority 2024e). This requirement has set challenges for smaller farms and farms whose fields have been in organic production but livestock have been under conventional production.

Responsible consumption is important for consumers, and various responsibility labels are used in food marketing. Many responsibility labels compete for consumers' attention alongside the organic certificate. The competitiveness of organic production on the food market is affected by people's weak understanding of the differences between various production methods as well as their impact on the environment and wellbeing.



Finnish organic research as part of the development of the global organic sector

Organic production is part of the local, but also regional, national, European and global food systems. The research and development of the Finnish organic production sector is, therefore, linked to their development. Identification and exploitation of the particular characteristics and strengths of Finnish organic production is central to regional, national and global development of the organic sector.

International cooperation is particularly important from the perspectives of research expertise and the effectiveness of organic production. The EU's research, development and innovation funding, both the framework programme and regional funding covered in part by the EU, plays a key role in leading organic production towards a sustainable, financially profitable and a socially fair organic food system. Research and innovation to resolve common challenges in organic production is supported by the following EU partnerships in 2024–2030:

- The Agroecology Partnership;
- Mission Soil: A Soil Deal for Europe;
- European Partnership for a Sustainable Future of Food Systems (FutureFoodS);
- European Partnership on Animal Health and Welfare (EUPAHW);
- EU Mission on Adaptation to Climate Change;
- European Biodiversity Partnership, Biodiversa+;



The European Technology Platform for Organic Food and Farming (TP Organics 2025) is one of the forty research network-based knowledge and innovation communities officially recognised by the European Commission. The goal of TP Organics is to shape research and innovation for organic and other agroecological approaches that contribute to sustainable and resilient food and farming systems in the European community. TP Organics stresses that research funding from the EU's Horizon Europe instrument should be directed to themes that have a significant impact on the execution of the EU's policy goals (Barabanova & Moeskops, 2019).

In cooperation with several other European organisations, the Finnish Organic Research Institute (FORI) participated in the preparation of the organic research strategy of TP Organics (Barabanova & Moeskops, 2019), the aim of which is to have an impact on the allocation of funding under the Farm to Fork Strategy. The new strategic research and innovation agenda of TP Organics, which gives priority to the European research needs of the organic production sector, is under preparation, and this report also supports its preparation.

Research effectiveness can also be improved by increasing cooperation between organic researchers and practitioners. The EU's research funding also focuses significantly on this by supporting living lab environments and activities. Living lab activities enable joint place-based development among multiple stakeholders by bringing together people with varied knowledge and from different sectors and, thus fostering the transfer, development and practical implementation of knowledge (Moeskops & Gernert 2022).

An important aspect in development of Finnish organic production is consideration of the specific northern characteristics, climate and regionally varying local conditions in which it operates. This also underscores the importance of Nordic cooperation in organic research. There are good examples from Finland of long-term cooperation in organic production to strengthen research, development and innovation (RDI) activities and regional vitality. As a result of long-term cooperation in organic production in South Savo, the region was awarded "Best Organic Region in the EU" in the 2024 EU Organic Awards.

In the future, networked living lab activities between multiple parties may offer a key solution in the diverse data-driven development of organic production customised for local conditions. Through living lab activities, the effectiveness of research will increase, and research methods and infrastructures will partly change their shape. This requires even better capabilities from members of the organic production sector to engage in multi-sector cooperation between multiple parties.

Research priorities for 2025–2030

Growth through knowledge

Research priorities in the Finnish organic food and farming sector in 2025–2030



Organic crop production

- Resilient organic crop production adapted to climate change
- Diverse and profitable crop production
- Environmentally sustainable organic crop production



Organic livestock production

- Welfare and health of organic livestock
- Profitable organic livestock production
- Environmentally sustainable organic livestock production



Diverse organic production

Organic production as part of the Finnish food system

- Organic consumption and markets
- Role of organic production from the perspective of the security of supply
- Subsidy policy, legislation and structures

In accordance with the principles of organic production, comprehensive farm management is based on best practices, promotes biodiversity and saves natural resources. This calls for close cooperation between different sectors to comprehensively obtain benefits from crop rotation, recycled fertilisers and side streams while conserving natural resources and addressing animal welfare. Research priorities have been evaluated at the production sector level and take the comprehensive goals of organic production into account.

Organic crop production

- **Resilient organic crop production adapted to climate change**
- **Diverse and profitable organic crop production**
- **Environmentally sustainable organic crop production**

The food chain begins with primary production, the high operating capacity of which is a requirement for a well-functioning and sustainable food chain that assures high quality and availability of raw materials. Crop production on fields, on horticultural farms and in greenhouses is a key part of the Finnish organic production of food for people and feed for animals. The foundation of organic crop production is healthy soil and its extensive biodiversity. In recent years, there has been an increasing in understanding that human health is linked to the health of other animals, the soil and the environment in general. These sectors are firmly interlinked in organic production.

Resilient organic crop production adapted to climate change

Strengthening of long-term production capacity, resilience and local adaptation to ensure the sustainable production operability, including under variable conditions, is an important pillar of organic production. Northern conditions and the changing climate create both limitations to our production but also offer opportunities. In organic



production, proactive adaptation in response to various factors and changes that affect production is essential. This includes multiple research priorities for organic crop production. Themes that necessitate prioritization in organic crop production include: weed, pest and plant disease control including soil preparation and crop rotation; measures to increase diversity in agricultural environments; and the continuous development of farming methods.

In regard to development of farming methods, research investment into nutrient management, crop protection and soil fertility is important. Research base concerning the crop rotations of organic farms and their multifacetedness is also needed. Development of simple computerassisted operating methods for crop rotation planning that take the organic production regulations into account are also needed. Currently, for example, knowledge of the extent of diversification in crop rotation on Finnish organic farms is lacking.

Organic harvests are significantly affected by the balanced availability of nutrients, which can be improved through crop rotation, undersown crops, the cropping choices, recycled fertilisers and the use of livestock manure. More information about the impact of different fertiliser products and green manures on the volume and quality of harvests is needed. In crop rotation research, it would be important to assess the value of different plant species values as preceding crops and the benefits of mixed cropping to improve resilience.

In organic horticultural production, ways to improve the quality and market value of harvests by focusing on the monitoring and preventive control of plant pests and weeds, as well as the identification of sustainable and resilient varieties are needed. Diversifying the range of horticultural crops and varieties applicable to organic production is a significant research theme.



There are continuing challenges with availability of organic propagation material, and the approval of genome editing in production may further reduce the availability of propagation material that thrives in Finnish conditions. Development of propagation materials adapted to specific local conditions can be facilitated through promotion of breeding of organic heterogenous material. Regionally comprehensive crop production trials for the development and testing of varieties with qualities that make them ideal for organic production is important from the perspective of harvest levels, resilience and climate change adaptation.

Challenges of water management in farmland fields is exacerbated by climate change. Research should focus both crop resistance to drought as well as preventing soil compaction and challenges from overly wet conditions. The strengths and weaknesses of organic crop production in relation to preparedness in mitigating yield losses from such factors as increasingly extreme weather and pest pressures should be identified because these impact profitability and self-sufficiency.

Research questions:

How can the resilience of organic crop production be increased and how can we prepare for extreme weather, including increased drought, in a changing climate?

What impact do different fertilisation strategies and crop rotation systems have on the volume and quality of organic harvests?

Which organic propagation materials and varieties are best suited to the conditions of Finnish production?

What types of pre-emptive crop protection methods reduce harvest risks in organic crop production?

Which types of biological crop protection agents and growth enhancers approved for organic production are effective and beneficial to production in the Finnish production environment?



Diverse and profitable organic crop production

One of the key questions for attractive and vibrant organic production and farming is profitability. Using research to increase awareness of the added value generated by organic production is important. The diversification of organic production in terms of protein crops requires research data on the production of new crops and the development of the market for the derived organic products and with consideration for changes in consumption demand.

As vegetable consumption increases, there is substantial potential in organic horticultural production, in particular, for growth of current and new crops. Such growth necessitates supporting research in production methods as well as markets and profitability. There is reason to investigate why Finnish organic horticultural production has not grown in line with the established goals. In general, the obstacles inhibiting growth of production volume of organic crop production should be investigated.

The EU regulation on organic production, which entered into force at the beginning of 2021, requires that organic greenhouse production be developed so that it meets the new requirements set for growth substrates, crop rotation and crop diversity while simultaneously addressing the goal of increasing soil biodiversity. It would be important to produce information about how to respond to these requirements in Finnish

production conditions and taking the economic and ecological sustainability of production into account.

Production specialisation and circular economy solutions can offer new business opportunities in organic production. Examples of specialisation include the production of landraces and the development of their supply chain, ranging from the development of farming methods to their placement on the market. Specialisations may include the production of crops for the organic pet food market or the use of leftovers from product sorting in such production.

Longer monitoring periods and research data on how production meets the goals and demand set for organic production are required to improve the profitability of organic crop production.

Research questions:

Which current or new crops would be financially profitable and environmentally sustainable in Finnish organic crop production?

How can the production of domestic organic legumes and horticultural crops be increased, and how can the profitability of their production be improved?

What factors generate added value for Finnish organic crop production?

How can diversification be implemented so as to be financially profitable while supporting soil biodiversity, especially in the production of organic greenhouse tomatoes and cucumbers?

What factors inhibit expansion of annual and perennial organic horticultural production?



Environmentally sustainable organic crop production

Organic crop production relies heavily on an ecological understanding of the operation of farming systems and the ecosystem services they provide for people. Assessing the environmental impacts of organic production, developing assessment methods, and linking them to ecosystem services is important when seeking to develop more sustainable organic production in northern conditions.

Research of the impact of organic production on the climate, waterbodies and biodiversity is needed in the different production sectors and at the product level. The production inputs, farming methods, practices and measures used in organic production are comprised of a variety of individual factors on which limited research data is available, but which may be significant to reducing adverse environmental impacts of crop production.

For example, it would be important to produce research data on the significance and value of biological nitrogen fixation, carbon sequestration, pollination services and natural biological control for organic production. Further, it is important to produce research on the impact of pesticides and fertilisers on the environment, animals, people and biodiversity. Development of methods to assess overall sustainability as well as development in Finnish conditions of reliable methods to verify environmental loading is increasingly important. This calls for investments in the development of such assessment methods that address the special characteristics of Nordic organic production.

Research questions:

What are the environmental impacts of organic production across the different production sectors and production environments?

How do organic farming and the landscape features of the farming environment impact biodiversity?

How can weed control and carbon sequestration in soil be promoted simultaneously on organic crop production farms?

What actions can be taken to strengthen biodiversity in agricultural environments while supporting plant health and crop resilience?

What environmental and production benefits can be achieved through agroforestry methods?

Organic livestock production

- **Welfare and health of organic livestock**
- **Profitable organic livestock production**
- **Environmentally sustainable organic livestock production**

The goal of organic livestock production is responsible and environmentally friendly production and ensuring that food products derived from organic livestock production are not harmful to the environment, people or animals. A central aim is to facilitate the welfare and health of the different animal species and the fulfilment of the species-specific behavioural needs while still maintaining consideration for the livestock producers' income.



Welfare and health of organic livestock

A key part of responsible organic livestock production is animal welfare. It is linked to animal health, species-specific behaviour, and nutrition. Their importance is written in to organic legislation and production regulations. Research data on the growth, development and health of organic livestock in different production phases is essential to elucidating problems in welfare and health. Additionally, understanding of the impact of production regulations on animal welfare should be increased. Research-based knowledge on the welfare of organic livestock is needed to verify the animals' welfare to consumers.

The foundation of organic livestock health is disease prevention and hardy breeds and lines suitable for organic production. In organic animal rearing, disease control often calls for a holistic approach with a focus on improving the general health and immunity of animals. This approach includes optimised feeding, grazing, access to outdoor areas and reduced stress levels to improve the natural ability of animals to prevent diseases. It would be important to survey the availability of organic-approved feed supplements and complementary feed including quick-acting calcium products for the prevention of milk fever (parturient paresis) in cows and ewes. Finnsheep give birth to more lambs than other breeds, and they are particularly at risk of paresis due to their high fecundity. The use of special feed requires species-specific research evidence of the effectiveness of each product.



Grazing is a natural species-specific behaviour of livestock, especially for ruminants. Research-based knowledge is needed to develop practical grazing, pasture rotation, as well as the facilitating components that enable grazing and access to outdoor areas in winter. Farm examples demonstrating the practices for good grazing systems are also needed.

According to the legislation, the cow-calf contact (CCC) system of organic calves is not mandatory, only milk feeding until the age of 90 days. In many farms, CCC system is already successfully implemented. The need for research data on the different CCC systems will increase in the future, including in organic production. Research is needed for the practical arrangement of CCC systems in existing cow barns and to identify what types of structures are needed for them. The impact of different CCC systems on the welfare of calves and their dams, as well as calf growth and health, should be studied.

Because use of amino acids produced using genetically modified organisms is forbidden, production of feed with a balanced amino acid composition is a key challenge in organic pig and poultry production. New domestic, organically produced, and economically viable organic protein feed products are needed. In order to improve circular economy, ecology and the security of supply, it should be possible to utilise as feed the food industry's side streams, for example, in organic feeding.

More attention should be paid to the vigor of different breeds or breed combinations of sows, hens and chickens in organic production and to leg conformation. Rearing new livestock consumes substantial resources. One reason leg conformation is important in sows is that more piglets die under lame than healthy sows. Although peat bedding improves the leg conformation of chickens, alternative materials are needed due to the decline in peat production.



Grazing and access to the outdoors, plentiful bedding material and roughage improve the welfare of pigs and poultry and enable their natural behavioural patterns. Mobile chicken coops in across varied pasture area provide large amounts of insects, worms and fresh plants for chickens to peck. They are rich in important vitamins, amino acids and other substances that improve the animals' immune defence. Outdoor areas should be designed to avoid nutrient runoff, as well as such parasites and infectious diseases from wild birds and boars, including salmonella, avian influenza and African swine fever. Trees, shrubs and other vegetation that offer shade and protection impact the effective area utilized by poultry.

Research questions:

How do existing and expandable farm production buildings enable effective grazing and being outdoors, as well as best address animal behaviour, the prevention of environmental emissions, and the control of infectious diseases and parasites?

What impact does sward plant species composition have on the composition and nutritional value of feed, animal welfare, production and farm profitability?

How can the decreased milk production of dairy cattle and therefore the producer's income be compensated if feeding is grass-based only?

How can welfare be safeguarded if organic complementary feed is unavailable for disease prevention?

What new protein feed products are suitable for organic production?

What are the most ideal bedding material options to replace peat on organic farms?

What sort of breed or crossbreed is best suited to organic ruminant, pigs or poultry production?

Profitable organic livestock production

Organic livestock production must be financially sustainable. Reasonable labour input must result for producers in a reasonable income for their family. The profitability of organic livestock production must be ensured to make this possible and also to attract new entrepreneurs.

Demand and price for organic milk and meat are crucial factors determining whether shifting from conventional to organic production is profitable for the producer. For example, transition to organic production may be challenging if there is no buyer for the organic milk because a farm is not along a milk tanker's route or there is no local slaughterhouse for organic meat. Obstacles inhibiting transition to organic production and the opportunities of regional cooperation should be clarified. Cooperation between organic livestock and crop production farms should be encouraged at the farm and regional levels. Ways to improve the supporting conditions for organic production should be investigated.

While organic eggs have effective markets and demand, appreciation for organic meat should be increased and marketing and sales channels developed. The quality of organic meat and animal welfare needs to be demonstrated to consumers. Profitability, occupational safety and animal welfare can be improved through adoption of new technologies.

Research questions:

How can the transition to organic livestock production be made easier and how can profitability be improved?

What investments are required during transition to organic livestock production or when developing it? How much capital is required for these investments? Will they be profitable in the long term?

What new technologies and automation can be used in animal rearing in organic production conditions?

Environmentally sustainable organic livestock production

Organic production promotes environmental and climate protection, maintains the long-term fertility of soil, and significantly advances biodiversity and reduces synthetic chemical pollution of the environment. Organic livestock production is only permitted when associated with arable farmland. Organic livestock production is an important part of organic farm sustainability and environmental impact, and livestock and crop production are closely linked. Organic livestock are important to nutrient recycling on organic farms. Alongside crop rotation and the use of green manures, manure provides an important part of the nutrients for organic crops. Research on the impact of organic livestock production on climate, waterways and biodiversity is needed.

Climate change is increasingly exacerbating extreme weather conditions, including storms, heavy rainfall and high winds, as well as drought and heat. Heavy rainfall and especially rains after dry periods cause flooding and increase nutrient leaching from fields. Extreme weather conditions also increase risks in feed production and grazing and have an impact on animal welfare and health. More information is needed at the farm and regional levels to prepare for extreme weather and maintain the structure and fertility of soil.

Nutrient leaching of nitrogen and phosphorous into the environment can be reduced by refining animal feeding including by reducing overfeeding through, for example, improving the digestibility of feeds and using new feeding technologies. Better targeting of the different livestock groups via analysis of feed composition and formulation of feed rations for different stages of production is also important.



Grazing animals increase the diversity in the agricultural environment, i.e. the variety of plant and animal species. Manure and flowering plants in pastures and in the areas around arable fields attract insects, and edge habitats offer nesting opportunities. The impact of the plant species composition in grassland on biodiversity and sustainability should be studied. Grassland consisting of several types of plant species is not only more diverse but also more resilient in years with poor harvest and to other risks. Could the methods of agroforestry be used in Finland alongside grazing in traditional grazed forest and traditional rural biotopes by growing trees in open pastures? What benefits would tree shade and deep roots offer for animals grazing during a drought, heat or rain? What value do cultural factors related to grazing and landscaping have?

Research questions:

What is the overall role of livestock? What amount of livestock is sufficient and sustainable? What is the overall sustainability of different livestock species?

What forms of feed self-sufficiency solutions for overall sustainability do different types of production have?

How do livestock and different grazing regimes (continuous grazing, rotation) affect soil, its structure and fertility, and the amount of organic matter?

How can grazing be used to increase soil carbon and nutrient sequestration?

How can the uptake and utilisation of nutrients from manure be improved for crops and in the nutrient cycle and how can emissions be reduced? Can nitrogen and phosphorus emissions, in particular, be reduced through improvements in the digestibility of feed and through use of more accurate feeding equipment?

Do outdoor activities in winter, the use of outdoor enclosures or shelters and the structures of enclosures affect nutrient emissions?

How can effective and acceptable fertilisers be made from cattle manure for horticultural production? Can products with a higher added value be made by improving the processing of cattle manure?

Diverse organic production

Organic primary production nowadays includes beekeeping and the collection of wild organic products in forests certified for organic production. Beekeepers produce honey and other bee products for the markets. Beehives also support crop production by providing pollination services not only in agricultural and horticultural production, but also for wildcrafted products.

A central question in recent years for organic beekeeping is how to develop its profitability. The use of imported organic sugar in the winter feeding of bees creates challenges in terms of profitability. It would be necessary to find a domestic replacement for imported organic sugar. When using honey, the impact of different types of honey on the success of overwintering should be studied.

Finland has a large forest area certified for the collection of wild organic products. Fragmentation of the certified forest areas and the low attractiveness of certification from forest owners' point of view are hindrances to the commercialisation of wild organic products. Finland has a potential for a more large-scale use of wild organic products, including exports, but such utilisation can only be realised if hindrances to the sector's development are solved. Research should be targeted to verifying the significance of wild organic products as part of the financial and social impacts of the multiple uses of forests.



Finland's National Programme for Organic Production includes an objective for the establishment of organic aquaculture. Previously identified challenges for development of organic aquaculture are: undeveloped domestic markets for organic aquaculture products, availability of fry material, and difficulties in obtaining new permits for fish farming. The substantial legislative restrictions set on organic production and its productivity increases the environmental impact per each kilogram of fish produced. Preliminary research identifying the necessary requirements for developing profitable organic aquaculture under the specific conditions of Finnish waterbodies is a necessary prerequisite to establishing organic aquaculture.

The assessment of production rules for organic insect production is currently in progress. In particular, organic insect production would provide organic insects as feed to replace fishmeal for organic poultry. After the rules for production of organic insects are approved and production guidelines prepared, Finland should also develop profitable and sustainable organic insect production.

Research questions:

Can domestic honey replace imported organic sugar in the winter feeding of honey bees?

Can organic beekeeping increase the harvest reliability of insect-pollinated crops?

What are the prerequisites to developing extensive aquaculture practices suitable for Finnish conditions?

What should be done to develop profitable processing chains for organic wild-crafted products for use as food and in cosmetic products?

Organic production as part of a sustainable Finnish food system

- **Organic consumption and markets**
- **Role of organic production as a cornerstone of the security of supply**
- **Subsidy policy, legislation and structures**

Organic consumption and markets

The aim has been to develop Finnish organic production in a more market-driven direction. This requires the development of not only exports but also domestic organic markets. It would be important to better understand food consumption and purchasing practices, as well as the preferences and attitudes of different consumer groups relative to the sustainability and health of diets.



Because organic cattle farming based on grassland production is one of the strengths of Finnish organic production, consumer acceptability of organic livestock products is a particularly important research theme. Is the meat of organic pasture-raised cattle, for example, more acceptable than a more conventional organic product? What impact does exceeding organic animal welfare certification requirements (e.g. calf housing in groups) have on consumers' interest and willingness to pay? Research of the welfare of organic livestock is required to verify welfare promises. While several welfare labels are used in livestock products, consumers' attitudes towards them compared to organic production are not known. We also need to study how information about welfare could be used in the marketing of organic products.

It is important to identify the growing product categories in which the range of organic products is small. These include ready meals, protein snacks and plant-based products. What types of new products would Finnish consumers of organic products like to see, and what types of Finnish organic products would have an export potential? Identifying the wishes and needs of professional kitchens is also important. Organic business should be profitable and customer-oriented. It would be important to develop profitable organic processing chains. When carrying out profitability calculations, the possible introduction of restrictions on cleaning agents and disinfectants used at production plants processing organic food should also be taken into account.



Research identifying how the prices of organic products are set and the factors contributing to the success of different sales channels for organic products should be conducted. Organic products have an image of high prices. It would be important to study consumers' willingness to pay, the price image and the actual development of prices in different product categories. Does the sales channel have any impact on consumers' willingness to pay?

Organic food products are promised to be safe and have high nutritional quality. The starting point in the processing of organic food products is to maintain the good quality of the raw materials and restrict the use of additives and processing aids to only that which is necessary to assuring product quality and safety. Concurrently, however, the sensory qualities and price levels of products must also be taken into account. The use of authentic raw materials in products affects end product price, and marketing of the product may be difficult if the price is too high. Unless required by law, such as the case of added vitamin D to homogenised skim milk, the general rule is that the nutritional quality of organic products is not inflated through the addition of vitamins, calcium or artificial sweeteners. This may have a positive or negative impact on consumers' interest towards organic products. More research is needed, especially on Finnish consumers' attitudes toward the use of added supplements in organic products and the processing methods. It would also be important to study how organic food products can be supplemented using methods approved for organic production.

Research on the health impacts of organic food is challenging and expensive. Rather than focusing on individual ingredients, impacts should also be able to be verified at a dietary level, and the impact of lifestyle should be separated from that of diets. Recent research has increased the understanding of the possible effects of diet on people's microbiomes and, thereby, their health. It would be important to promote research that investigates the health benefits of organic food using research methods that provide a more in-depth understanding of the relationships between organic food production, organic diets and human health.

Consumers' trust in the operation of the organic food chain must be fostered. This requires effective tracing methods and their further development, as well as effective ways to identify any food fraud in organic production.

Research questions:

Why is organic purchased, and why not? How can interest in organic products be developed into actual purchasing behaviour?

How can members of organic value chains be engaged in closer cooperation?

Generation Z as consumers: how will consumption change when current young people start families?

Do environmental arguments affect purchase decisions?

What impact do environmental factors and demographics have on the birth of organic consumers? What impact, for example, does the addition of vitamins to organic products have on consumers' desire to buy products?

In what ways and at what point do consumers form an impression of organic production? What factors affect it and how permanent are these first impressions?

What price image do consumers have of organic products and how close is it to reality?

How has communication regarding organic production changed and evolved from, for example, the 1950s onward, and how has communication or the lack thereof affected people?

What is the position of organic products alongside other sustainability labels?

Why is further processing of organic raw materials in Finland such a small-scale sector? What are the obstacles, and how have such obstacles been overcome in other countries?

Does organic production have an impact on the food microbiome, and could it have beneficial effects on human health?



Role of organic production from the perspective of the security of supply

In recent years, the significance of self-sufficiency has become emphasised. In public discussion, self-sufficiency is mainly understood narrowly as comprising the volume of food produced relative to domestic consumption. Reliance on living ecological systems and cycles, including nutrient recycling, is part of the principles of organic production (IFOAM 2024), which leads to the assumption that self-sufficiency would be higher in organic than in conventional production. In practice, this is evident in the production conditions set for organic production, which require the use of biological nitrogen sequestration and nutrient recycling in crop production, as well as a certain degree of feed self-sufficiency in livestock production.

However, research data on self-sufficiency in organic production is scarce. A better understanding of the role of organic production from the perspectives of security of supply and self-sufficiency calls for further research. The theme should be studied at the farm, regional food system and the national levels.

A clearer vision of the role of Finnish organic production as part of a more sustainable food system is needed. The vision should answer the questions of what type of food should be produced and for whom. What type of food production do different food system stakeholders want? This also entails the question of self-sufficiency in food production and consumption, including the role of imports and exports in organic production.

For this vision, research data on the agroecological and socioeconomic impact of organic production, including linkages between the impact, is needed. Research can help to identify the strengths of Finnish organic production. Among other benefits, this can facilitate more effective allocation of support compared to the present. There is a clear need to research the environmental impact of Finnish organic and conventional production and the differences between the two from the perspectives of resource use and self-sufficiency. It would be important to conduct economic valuation of the benefits of organic production through ecosystem services or lower nutrient and chemical emissions in waterbodies and soil.

Research questions:

How self-sufficient are organic producers relative to conventional farmers in terms of production inputs? How local are these inputs? What percentage is domestic?

What factors affect the self-sufficiency of farms? How can increased self-sufficiency be supported in the food chain?

How could regional planning support the development of organic production and increase the self-sufficiency and vitality of rural areas?

Subsidy policy, legislation and structures

Organic production is guided by the EU regulation on organic production and labelling of organic products (EU 2018/848), national law and the Finnish Food Authority's more detailed guidelines for the fulfilment of the requirements set for organic production. Furthermore, most organic farmers receive organic farming payments through the five-year commitment to organic production as part of the Agri-Environment-Climate Measures (AECM) support scheme.

Producers have criticised the organic regulations, monitoring, cost of monitoring and whether AECM is fit-for-purpose. More comprehensive research of the effectiveness of organic regulations and subsidies relative to the objectives set for them would be required. In the future, different options and impacts of the allocation of organic subsidies should be examined. It would be important to assess the ways in which market access for organic products may be improved while simultaneously improving the profitability of organic production.

Research in the social sciences helps us understand the position of organic production and all the factors affecting its development. Agricultural production remains highly dependent on agricultural support payments policy, which is defined by the Common Agricultural Policy (CAP). We should better understand the structures and regulations that advance or hinder organic production. It is important to clarify the societal impacts expected from organic production. Would these be more effective food production or more extensive production on the environment's terms? How is the support provided by organic production for ecosystem services valued by society? Information and initiatives are also needed to remove obstacles within the CAP subsidy schemes and legislation that create barriers to using sustainability-promoting agroforestry practices.

Decision-making is done by people. It would be important to understand the attitudes of political decision-makers towards organic production, as well as changes in attitudes. A better understanding of attitudes would also support the development of



communication regarding organic production. It would be important to understand how organic production has been and is communicated in Finnish society and how changes at the food system level and in related objectives have affected the position of organic production in public discussion.

There can be no organic production without organic producers. It would be important to understand the factors that affect decisions to start or stop organic production. What is the reputation of organic production in the eyes of young producers and agricultural students? The perspective of social sustainability is also associated with the interest and motivation of farmers. Is organic production socially sustainable in Finland, and how could social sustainability be improved?

Our society is undergoing a digital revolution, which also entails the use of AI. It would be important to assess and develop all the ways of using digitalisation, robotisation and AI applications in organic production to steer production, monitoring and traceability in a cost-effective direction.

Research questions:

What market and governance reforms are required to expand and stabilise organic production in accordance with the objectives set for it? Do the current organic farming payments support the achievement of the objectives set for organic production?

How effective are the current support mechanisms for organic agriculture and more extensive agricultural policies? How could environmental and market goals be better integrated into organic production support?

What is the current and future level of organic producers' wellbeing and coping, and what factors affect it?

What affects people's attitudes towards organic production?

How could AI and digital applications be effectively used in organic production and monitoring?

In conclusion

Advancing technological developments are also reshaping the research in the organic sector and enabling new research methods and analysis. For example, the development of precision agriculture and the drone-assisted monitoring of crops and pests may enable more effective and accurate production plans, as well as the better targeting and timing of production and crop protection measures. AI can offer opportunities for various purposes, ranging from primary production to increasing consumers' understanding.

The development of organic research also requires investments in research infrastructures and networks. The organic business sector needs longitudinal trials and research on organic farms and in organic companies. Additionally, combining of diverse expertise through multi- and interdisciplinary research questions is emphasised in the development of organic production. The know-how provided by expertise, infrastructures and networks, as well as the exchange and use of information, enable the development of organic production and the effectiveness of organic research.



References

Barabanova, Y. & Moeskops, B. (eds.) 2019. Strategic Research & Innovation Agenda for Organics and Agroecology Leading the transition to sustainable food and farming in Europe. TP Organics, Brussels. 56 p. tporganics.eu/wp-content/uploads/2020/01/ifoam-sria-full-version-final.pdf

Finnish Food Authority 2024a. Ruokavirasto. Luomutilastot. Luomutilat ja luomutuotantoala 2023. <https://www.ruokavirasto.fi/globalassets/viljelijat/luomutilat/tilastot/luomu-2023ep.pdf>. Accessed on 10.2.2025.

Finnish Food Authority 2024b. Ruokavirasto. Luomutilastot. Luomuhyväksytty tuotantoala 2023. <https://www.ruokavirasto.fi/globalassets/viljelijat/luomutilat/tilastot/lkasva2023.pdf>. Accessed on 10.2.2025.

Finnish Food Authority 2024c. Ruokavirasto. Luomutilastot. Luomuhyväksytty tuotantoala 2024 ennako-tieto. <https://www.ruokavirasto.fi/globalassets/viljelijat/luomutilat/tilastot/lkas-va2024ennakko.pdf>. Accessed on 10.2.2025.

Finnish Food Authority 2024d. Ruokavirasto. Luomutilastot. Luonnonmukainen eläintuotanto 2023. <https://www.ruokavirasto.fi/globalassets/viljelijat/luomutilat/tilastot/lelain2023an.pdf>. Accessed on 10.2.2025.

Finnish Food Authority 2024e. Ruokavirasto. Myyntikasvivaatimus. <https://www.ruokavirasto.fi/tuet/maatalous/hakuoppaat-ja-ohjeet-viljelijaille/vanhemmat-oppaat-ehdot-ja-ohjeet/viljelijatukien-hakuopas-2021-2022/paatukihaun-tuet/luonnonmukaisen-tuotannon-korvaus/luonnonmukaisen-tuotannon-korvaus-2022/#Myyntikasvivaatimus>. Accessed on 10.2.2025.

IFOAM. 2024. The four principles of organic agriculture. <https://www.ifoam.bio/why-organic/shaping-agriculture/four-principles-organic>. Accessed on 25 November 2024.

Kantar 2023. Luomun kuluttajabarometri 2023 (Organic consumer barometer 2023). <https://proluomu.fi/wp-content/uploads/2023/09/luomun-kuluttajabarometri-2023.pdf>. Accessed on 10.2.2025.

Luke 2024a. OSF. Natural Resources Institute Finland. Crop Production Statistics. Yield of the Main Crops 2024. <https://www.luke.fi/en/statistics/crop-production-statistics>. Accessed on 10.2.2025.

Luke 2024b. OSF. Natural Resources Institute Finland. Number of Livestock. <https://www.luke.fi/en/statistics/number-of-livestock>. Accessed on 10.2.2025.

Ministry of Agriculture and Forestry. 2023a. The Implementation Plan for the Organic 2.0. Publications of the Ministry of Agriculture and Forestry 2023:3. <http://urn.fi/URN:ISBN:978-952-366-863-8>. Accessed on 10.2.2025.

Ministry of Agriculture and Forestry. 2023b. Organic 2.0 – Finland’s National Programme for Organic Production 2030. Publications of the Ministry of Agriculture and Forestry. 2023:9. <http://urn.fi/URN:ISBN:978-952-366-580-4>. Accessed on 10.2.2025.

Moeskops, B. & Gernert, M. (ed.). 2022. Organic living labs and lighthouse farms in Europe. https://tporganics.eu/wp-content/uploads/2022/10/TP0_Study_Organic_Living_Labs_2022.pdf. Accessed on 21 January 2025. Accessed on 10.2.2025.

ProAgria 2024. Tuotosseurannan tulokset 2023 (Results of milk recording 2023). <https://www.proagria.fi/uploads/tuse/Lypsykarjan-tuotosseurannan-tulokset-2023-opas.pdf>. Accessed on 10.2.2025.

ProLuomu 2025. Luomumarkkina hakee suuntaa – vielä ei päästy uuseen nousuun. <https://proluomu.fi/luomumarkkina-hakee-suuntaa-viela-ei-paasty-uuteen-nousuun>. Accessed on 7.2.2025.

ProLuomu 2024. Luomu Suomessa 2023 (Organic production in Finland 2023). <https://proluomu.fi/wp-content/uploads/2018/03/luomu-suomessa-2023.pdf>. Accessed on 10.2.2025.

Rajala, J. 2006. Luonnonmukainen maatalous (Organic agriculture). University of Helsinki, Ruralia Institute, publication no. 80. ISSN 0786-8367

Report on the use of organic products in public food services. Selvitys julkisten ruokapalveluiden luomun käytöstä. <https://www.luomuravintola.fi/resources/public//sisaltokaruselli/luru-info2304aural.pdf>. Accessed on 21 January 2025.

TP Organics. 2025. Organic research & innovation to deliver sustainable foos and farming systems. https://tporganics.eu/wp-content/uploads/2025/01/TPO_RnI_HEU_Position_Paper_WP2026-27.pdf. Accessed on 10.2.2025.

TP Organics. 2024. Organic research & innovation to deliver sustainable food and farming systems. https://tporganics.eu/wp-content/uploads/2024/04/TPO_RnI_HE_Position_Paper_WP2025-27_new.pdf. Accessed on 10.2.2025.

Willer, H., Trávnicek, J. & Schlatter, B. (ed.). 2024. The World of Organic Agriculture. Statistics and Emerging Trends 2024. Research Institute of Organic Agriculture (FiBL), Frick, and IFOAM – Organics International, Bonn



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