



Knowledge grows



Our Opinion on

Organic Farming

Executive summary

Food systems need to become more sustainable, and farming has a key role to play. Organic farming is often touted as the way forward, as it is aiming for more sustainable farming practices. However, organic farming also presents dilemmas. The most significant drawback is the low productivity level, and consequently that it requires more land. This poses a risk to the food system and the planet. Organic farming alone cannot feed the world population. Crop-land expansion leads to more greenhouse gas emissions per ton of food produced and is harmful to biodiversity.

Yara will support organic farmers in addressing these issues and in implementing best nutrient management practices. The company's core competence is managing nutrients in the most sustainable and efficient way. Yara is open minded to any crop production system, and believes that a science-based, transparent and comprehensive approach to sustainability is required. Sustainable farming should be the focus in policy development, rather than upholding one particular farming system as the goal.

Organic farming – objectives and current situation

Organic farming aims to produce food using natural substances and processes.¹ Governments or associations define the rules and regulations governing the production, distribution and marketing of organic products. There are variations in different geographies. In Europe, the European Union sets out the principles. Organic farming prohibits the use of agrochemicals, encourage high standards of animal welfare and places a strong focus on biodiversity. Although mineral fertilizers only consist of naturally occurring nutrients, organic farming restricts the use of most mineral fertilizers, because they are processed industrially. Mineral fertilizers such as micronutrients are allowed if the farmer can prove nutrient deficiency. A lack of plant nutrients is the main explanation for why organic farming systems experience lower yields per hectare.

1.5 billion hectares of land is used for crop production globally.² Organic farming accounts for around 71.5 million hectares, i.e. 4.8 percent of

the total arable land.³ Agriculture covers roughly 40 percent of the land in Europe. In the EU, the organic area increased by 70 percent from 2007 to 2017, from 7.3 to 12.6 million hectares.⁴ Because the productivity level is typically lower, the price of organic products is generally higher, and it serves a relatively small market segment.

Developments in Europe

In 2019, the European Commission launched the European Green Deal, which sets out policy initiatives to make Europe the first climate-neutral continent by 2050. It includes a strategy that addresses the challenges of sustainable food systems, called the Farm to Fork Strategy.⁵ One objective is to have at least 25 percent of the European Union's agricultural land under organic farming by 2030. The Commission will develop an action plan on organic farming to help member states stimulate both supply and demand for organic products.

Our Opinion on Organic Farming



Feeding the world

Today, there are almost eight billion people on the planet, and the world population is expected to reach 9.8 billion in 2050.⁶ About half of all food globally is produced using mineral fertilizers.⁷

The Food and Agriculture Organization of the United Nations (FAO) estimates that around one third of the food produced each year is lost or wasted.⁸ A part of the increase in food demand can be met by eliminating or reducing food loss and improving infrastructure. Research shows that a healthy crop that has received the right nutrients has a longer shelf-life, and mineral fertilizers can thereby contribute to reduction of food waste.⁹

Sustainable intensification of primary food production is paramount to meet future demand even with additional efforts to mitigate losses. Without implementation of measures that reduce the demand, organic farming alone cannot sustain the present global population, nor the population projected to live on this planet in the decades to come. The primary concern is the lower yield levels for the major cereal crops.¹⁰ Productive agriculture is needed to ensure affordable food. A fast shift to low-yield production can have a shock-effect on food prices.

Productivity levels and their climate effects

Annual crop yields on organic farms are on average significantly lower, ranging between 40 percent and 85 percent of conventional farming yield.¹¹ The correct way to compare productivity of farming systems is to assess the averages from many farms over large areas and several years. The productivity measure needs to also consider the unproductive years, e.g. if legumes crops are grown to fix nitrogen.

The largest source of greenhouse gas emissions from agriculture (as much as 47 percent) comes from the conversion of natural land into farmland. We should measure greenhouse gas emissions as emissions per tonne of food produced, rather than emissions per hectare.

Organic farming faces two major challenges. First, organic farming will always require more land to produce the same amount of crop, and research indicates that an additional 65 percent to 200 percent extra land is required.¹² A large-scale transition to organic farming would lead to cropland expansion, with the consequence of a net increase in greenhouse gas emissions.¹³ Secondly, larger cropland areas would reduce areas of untouched nature which would pose a challenge to biodiversity.

Optimizing agricultural productivity is needed in all farming systems, for economic, environmental and social reasons.

Environment and resource efficiency

There are other environmental impacts of agriculture than greenhouse gas emissions and consumption of land area. Adding more nutrients than the crops require, either from mineral fertilizers or organic fertilizers, can cause leaching. If excessive nutrients reach waterbodies, overgrowth of algae (eutrophication) can occur. Good farm management practices, and a strict focus on nutrient use efficiency is key regardless of farming system.

Resource efficiency is necessary to contribute to a zero-waste society. In farming, this means to both use the nutrients already available on the farm as fertilizers, such as manure and crop residues, and to innovate with the aim of safely bringing recycled nutrients from other sources (e.g. wastewater sludge) back into the loop as fertilizers.

Nutritious and healthy food

There is no evidence of a difference in nutritional quality between organically and conventionally produced food, as shown in a systematic review of studies.¹⁴ Both for nutritional content, food safety and taste it is suggested that the variance between farms, seasons, soils and the lengths of the supply chains accounts for most of the differences observed in food quality.





Yara's opinion

Yara wants to be a long-term partner of all farmers

Yara's mission is to responsibly feed the world and protect the planet. We are aiming to spearhead the transition to more sustainable and efficient food production and food systems.

Yara firmly believes that avoiding expansion of farmland into untouched land is the most important measure to avoid greenhouse gas emissions and securing farming-free areas for biodiversity. Yara's solutions and knowledge of best nutrient management practices and how to produce more on less land, are relevant for all farming systems, including organic farming. As highlighted above, organic farming is facing challenges related to productivity and environment, and Yara wants to support organic farmers to address these issues. The aim is to bridge the different farming systems. Yara promotes crop- and site-specific best management practices of crop nutrition, appropriate to each country and region worldwide. Yara's aspiration is to be a long-term partner of all farmers, regardless of which farming system they are using.

In addition to a large portfolio of mineral fertilizer products, we also offer a range of fertilizers used for organic farming, such as YaraNature and YaraBio, and micronutrient products across several markets.



A strong focus on nutrient use efficiency is of critical importance

Yara promotes nutrient- and water use efficiency, and balanced crop nutrition including available on-farm nutrients, such as manure and residuals. Improving nutrient-use-efficiency (NUE) is a critically important concept. NUE is the proportion of the mineral and/or organic nutrients applied that is taken up by the crop.¹⁵ A focus on NUE in the Farm to Fork Strategy is a much-needed development to address climate and environmental challenges. A high NUE means that little to no nutrients are lost (both to the air and as nutrient run-offs).

Conservation practices, such as crop rotation, reduced tillage, mulching and cover cropping are good ways of reducing nitrogen losses to the environment while improving soil health and productivity. This is relevant regardless of whether you are using organic or mineral fertilizers.

Yara has through its long-term cooperation with farmers experienced their focus on both protecting the environment at the same time as maintaining both socially and economically viable businesses. Further improvements in environmental performance is not a matter of choosing one farming systems over another, but rather to use best practice on-farm management.

For decades Yara has invested in digital technologies to help farmers decide the precise nutritional needs of their crops. Farm operations will be further professionalized through these precision farming technologies which are currently fairly immature in organic farming systems compared to the wider agricultural sector.

Yara is taking the lead in circular economy

Yara believes that the emerging circular economy will change agriculture and will require a shift in the entire food industry. We have a strong focus on resource-use efficiency. Yara is therefore exploring opportunities to use recovered and organic nutrients as a part of our portfolio and crop-specific offering. Through our strategic partnerships with waste management and food companies, Yara works to find the best avenues to close the nutrient loop and provide more organic fertilizers.

A science-based, transparent and comprehensive approach to sustainability is required

Science and knowledge are at the core of Yara's business. Scientific experimentation must be the basis for environmental impact studies and should be used to improve the sustainability of all farming systems (organic or conventional). Sustainability challenges are interlinked, and the use of selective facts and research must be avoided.

Transparency and traceability also on sustainability metrics should be leveraged to inform consumer choice both for organic and non-organic produce. Special subsidies for organic farming could be seen as subsidizing the more affluent consumer and would be better targeted towards all farming systems to encourage more sustainable production methods.

If the expansion of organic farming is seen as the main avenue to meet the sustainability targets in the European green deal, sustainability should be measured consistently and scientifically across all farming systems. Productivity per hectare must be maintained during the conversion from existing farming systems to an organic farming system.

Our Opinion on Organic Farming



This productivity will continue to depend on the availability of essential plant nutrients. Europe is already a net importer of crops, and at risk of becoming a major driver for tropical forest destruction.¹⁶

Environmental management must look beyond the scale of the individual farm. Environmental research, regulations and support measures must keep focus on the impact of farming on water and air quality and biodiversity at a regional scale. These environmental objectives will not be met simply by converting farmland to organic farming. In fact, if sustainability measures are not applied consistently and scientifically to organic farming, the negative environmental impact of agriculture would increase.

It is important that the policies and measures introduced are scientifically sound and based on thorough impact assessments. Policy makers must have a holistic approach to sustainability, making sure they are not creating new problems by solving others. Sustainable farming should be the focus in policy development, rather than specifying one particular farming system as a goal.

About Yara

Yara grows knowledge to responsibly feed the world and protect the planet. Supporting our vision of a world without hunger, we pursue a strategy of sustainable value growth, promoting climate-friendly and high-yielding crop nutrition solutions for the world's farming community and food industry.

Yara's ambition is to be the Crop Nutrition Company for the Future. We are committed to creating value for our customers, shareholders and society at large, as we work to develop a more sustainable food value chain. To achieve our ambition, we have taken the lead in developing digital farming tools for precision farming, and work closely with partners throughout the food value chain to improve the efficiency and sustainability of agriculture and food production.

Founded in 1905 to solve the emerging famine in Europe, Yara has established a unique position as the industry's only global crop nutrition company. With our integrated business model and a worldwide presence of around 16,000 employees and operations in over 60 countries, we offer a proven track record of responsible and reliable returns. In 2019, Yara reported revenues of USD 12.9 billion.

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