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Trends and challenges in organic farming in the European Union

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Abstract Organic agriculture is a production and management system which takes into account the biodiversity, biological cycles, and increased biological activity of soil. Water balance in soil is one of the key factors in organic farming. Currently, organic farming is globally becoming more and more important because of people ś environmental and health concerns. Economic reasons are the strongest motivators of farmers for converting from conventional to organic production, however; the savings coming from lower farming costs. In the European Union (EU), the organic farming area is increasing by about 500,000 ha per year representing now about 6.2% of the total agricultural area. The variation in different countries is high inside EU due to various factors. The best agricultural practices are deployed in organic farming helping farmers to adapt to climate change by strengthening agro-ecosystems, improving soil structure, water management, and water quality, diversifying crop and livestock production, while concomitantly building farmers' knowledge base.

Keywords: Organic farming in EU, agriculture, economics, organic products

Introduction

Organic farming is a production system that maintains soil fertility, ecosystems, and communities. By adopting ecological processes, biodiversity and cycles adapted to local conditions, rather than exploits inputs with adverse effects (IFOAM, 2018). Throughout the last decades, the organically cultured area in the world increased significantly indicating to people ś concerns about sustainable development. The data from 178 countries from the year 2016 show that organic agriculture consists of only 1.2 % of the total agricultural land (Willer and Lernoud, 2018). Moreover, organic agricultural land in the world is 57.7 million hectares in 2016, including the in-conversion areas. The regions with the largest areas of organic agricultural land are Oceania 27.3 million ha, which is 47.3 % of the world's organic agricultural land, and Europe 23 %. Latin America has 7.1 million ha followed by Asia (4.9 million ha, 8.5 %), North America 5.4 %, and Africa (1.8 million ha, 3 %) as shown in Table (1).

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Table 1. Organic agricultural land in the world in 2016

Continent	Organic area by Million ha	% share of the organic area
Oceania	27.3	47.3
Europe	**13.5**	23.4
Latin America	7.1	12.3
Asia	4.9	8.5
North America	3.1	5.4
Africa	1.8	3.1
World	57.7	100.00

Source of the data: Research Institute of Organic Agriculture, FiBl (www.fibl.org) (Willer and Lernoud, 2018).

As to individual countries, the largest area is accounted for by Australia (22.7 million hectares), then Argentina (3.1 million hectares), and the United States (2 million hectares). The biggest number of organic producers are in India. North America and Europe are the strongest markets for sale (Lernoud and Willer, 2018).

The market for organic products is subject to supply and demand. When the demand increases, producers are supposed to increase their production and increase technological innovations. In such a situation the increased scale of production tends to reduce costs of the production, processing, distribution, and marketing. The production price of a farming product is a reflection of the real costs of labour, fertilizers, agent for diseases, insect and weed control, harvesting, transport, and storage. There are also other reasons behind the usually higher prices of organic foods: the cost of certification, limited supply for organic food compared with the demand, increased labour input per unit area, and costs due to harvesting in smaller quantities than in conventional farms. There are, however, factors favouring organic farming. Organic farming minimizes harms to the environment and maintains the fertility of soil, often by the crop rotation. Organic farming promotes the welfare of the farmers and their animals by avoiding the use of unnatural chemicals (pesticides and herbicides). Organic farming also increases employment while ensuring adequate income for bigger number of farmers (FAO, 1999). The fast growth of organic farming has also faced challenges that may risk its sustainability (Brzezina *et al.*, 2017).

Overall, the conversion from conventional to organic agriculture has significant long-term benefits, such as increased biodiversity, reduction of soil erosion, and lower environmental impact. In spite of slightly lower yields, profitability of organic farming is better due to governmental allowances, as well as the higher market prices.

Organic agriculture in European Union

The situation of organic agriculture in EU is progressive. Organic farmland has more than doubled in the last decade and each year 500 000 hectares of land are converted into organic production. The legislative framework tries to keep up with such growth and still includes different practices and derogations (Ecofin, 2018).Accordingly, the organic farm sector in EU has been rapidly developing during the past years. The organic area is cultivated by almost 185 000 farms. According to Eurostat data (EU-28) EU had in 2015, a total area of 11.9 million ha cultivated as organic which can be compared with 5.0 million ha in 2002. This is a very big increase, but the completely organic area still represents only 6.2% of the total utilised agricultural area in EU. A specific feature in EU is that organic holding farms tend to be bigger than conventional farms. It could be due to the fact that organic farm managers tend to be younger than the conventional farmers and would like to start investing in bigger areas. The organic farms are active both in the arable crop and orchard, as well as, animal sectors. The permanent pasture represents 58%, cereals 20% and permanent crops such as olives, grapes, apples etc. 15%.

As to organic livestock, organic farmers are required to maintain animals without antibiotics or synthetic growth hormones. In addition, organic farmers must provide animals with 100% organic feed and safe, clean, cage-free living conditions. In a number of heads of organic livestock, it consists of poultry (80 %), sheep (9 %), and cattle (7 %). Other animals include pigs (2 %) goats and others (2 %) (Meredith and Willer, 2016).

Main trends in organic agriculture in European Union

The increased consumer awareness of food safety and the environment has contributed to the growth of organic agriculture in EU (Borell and Sbrensen, 2004). Some people see organic products as more delicious or healthier than those from traditional farms. Some people favour organic products because the farms follow good practices as to the environment or increase the employment (Smith-Spangler *et al.*, 2012; European Commission, 2016).

From 2012 to 2016 there was an increase from 5.6% to 6.7% of the total size of land used for organic agriculture. By country, the highest share of arable land for organic farming is in Austria, Estonia, and Sweden with each dedicating more than 18% of the total arable land for organic farming. The countries the Czech Republic, Italy, Finland, and Latvia had all dedicated more than 10% of the total arable land. The United Kingdom was lower on the list

with less than 5%. However, the countries are not equal in the total agricultural area, therefore, the total organic area in EU (EU-28) was 11.9 million ha in 2016. Among the Member States of EU, Spain, Italy, France, and Germany have registered as the largest organic areas, as well as the largest numbers of organic producers in 2016 (Fig. 1).

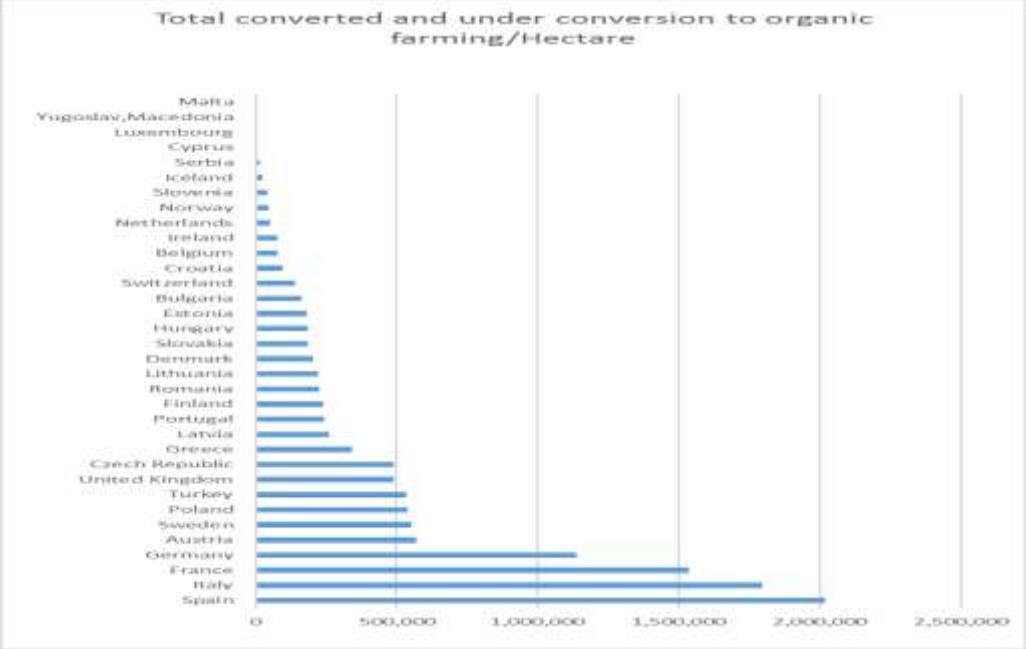

Figure 1. Total converted and under-conversion to organic farming in EU, 2016
Source: Eurostat statistics, 2016 (European statistics, 2017)

Those 4 countries in Fig 1 (4 biggest bars) together represent for 54% of both total EU organic crop area and organic producers in the EU. Conversely, in 2015, these countries represented for a slightly less (52.8%), which shows that the land used for organic farming increased in 2016. Spain contributed the most to organic farming (16.9%), then Italy (15.1%), France (12.9%), and Germany (9.5%). Within the flourishing European organic products market, the number of organic farmers in EU has increased. In 2015, the total value of organic goods sold was €29.8 billion. Switzerland, Denmark, and Sweden (per capita) are the biggest consumers of organic food in the world indicating to the high standard of living in these countries (European Commission, 2016).

Arable land crops include mainly cereals, fresh vegetables, green fodder, and industrial crops. Permanent crops include vineyards, olive groves, fruit trees, and berries. Permanent grasslands include meadows and pastures. Spain,

Italy, and France have a large part of the permanent cropland occupied by olives, grapes, and nuts. From 2005 to 2014, the land area for organic grapes increased 204% and for temperate fruits 150% (Meredith and Willer, 2016). Before an area can be considered as 'organic', it must undergo a conversion process, which takes 2-3 years depending on the crop, and therefore between 2012 and 2016, Croatia and Bulgaria as new EU members recorded growth in the total organic area of over 100%.

Grain products are an important category of organic because they provide good opportunities to enhance company identity and customer loyalty. Retailers want to sell to consumers safety and health in food (Levidow and Bijman, 2002). By countries, the total organic area of cereals in EU (EU-28) was 1.890 million ha in 2016. Among the Member States, Italy, Germany, France, and Spain had the largest organic areas as well as the largest numbers of organic producers (Fig. 2). Italy contributed the most land (299.6 thousand ha) and consist of (15.9%) of the EU ́s organic land for cereals (including the seeds), then Germany (12.9%), France (11.5), and Spain (11.5%). Those countries represent 51.7 % of the total area in EU ́s organic cereals.

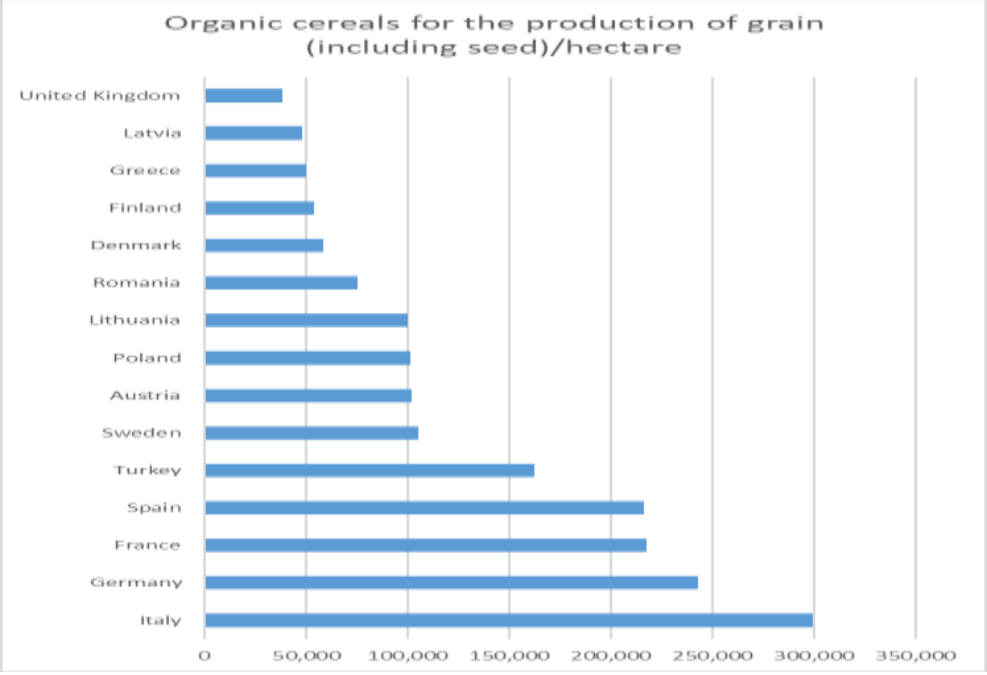

Figure 2. Total crops area for organic cereals (converted and under conversion) in EU in 2016
Source: Eurostat statistics, 2016 (European statistics, 2017).

Pasture and meadows, mostly used for grazing organic livestock, in 2016 exceeded 5 million ha, which represented 45.1 % of EU ś total organic crop area. Arable crops followed closely with 44.0 %, while permanent crops made up the smallest share of 10.9 % (European Commission, 2016). Latvia was in the lead regarding organic bovines, with 22 % of the total bovine population. In total 8 of EU ś Member States had over 10 % of organic bovines, with Sweden third after Latvia and Austria. For most EU ś Member States organically reared pigs accounted for the remarkable small share of the total pig population. Under organic livestock production systems, consumers expect organic milk, meat, poultry, eggs, leather products, etc. to come from farms that have been inspected to verify that they meet rigorous standards. In 2017 UK registered the largest amount of 48800 tonnes organic meat production and then Spain and Sweden both around 26500 tonnes (Fig. 3).

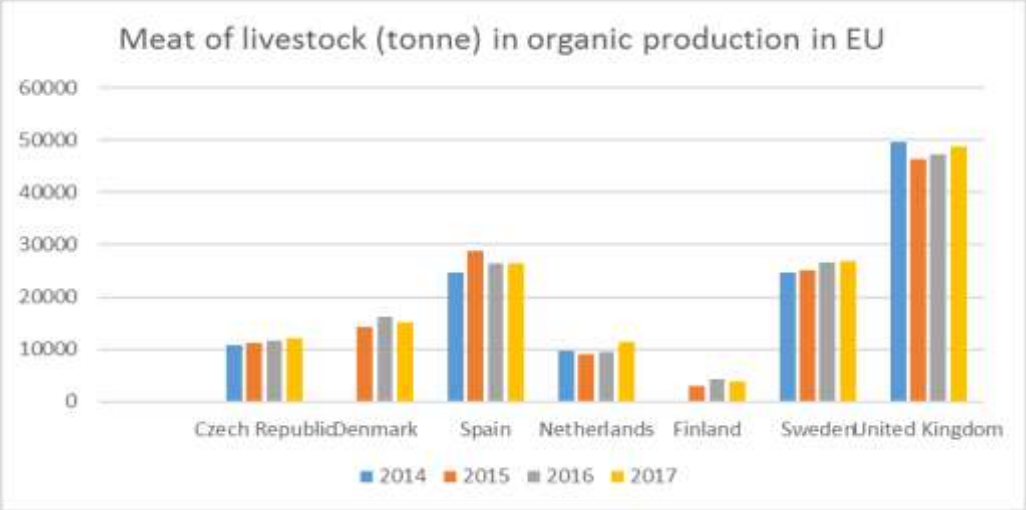

Figure 3. Meat of livestock in organic production in EU, 2016
Source: Eurostat statistics, 2016 (European statistics, 2017)

In EU, organic agriculture has had very successful progress during two last decades due to EU ś strong efforts to adopt organic agriculture with its positive impacts on sustainable development. At the same time, the organic market has developed and products diversified to meet demands for organic production (Brzezina *et al.*, 2017). This has been accompanied by steady market growth over a few last years, for example, the total value of the EU ś organic retail market was more than doubling from €11.1 billion in 2005 to €24 billion in 2014 (Meredith and Willer, 2016).

Organic agriculture in cold climate: The case of Finland

Finland ́s agriculture is characterized by the cold climate and population of about 5.5 million. Finland is self-sufficient in major agricultural products. They are potato, sugar beet, cereals, milk, meat, and eggs. Certain vegetables are available during a part of the year. The amount of arable land has slightly increased to a total of almost 2.3 million ha. Agriculture is an important employer, which together with the food chain employs 240,000 people. Agriculture is the foundation of the Finnish food supply and most of the foodstuffs are of domestic origin. Farmers' income in Finland, like in all EU countries, includes considerable support payments (subsidies) under the common agricultural policy of the EU and/or national schemes (MTK, 2017; Ministry of Agriculture and Forestry, 2014).

Primary agricultural production in Finland employs about 100,000 people. Finland has 48,000 farms with an average arable area of 47 hectares. Of these, about 12 % are organic farms. The average age of farmers is 52 years. The farmers are young compared to their European colleagues (Niemi and Väre, 2017). Organic agriculture in Finland has developed like in other EU countries in terms of the production and area, which constitutes 10% of the area and seeks to reach 20% by 2020. The goal has already been reached in some region. In Finland, the demand for organic products is steadily increasing (Ruralia-institute, 2018). This is a result of the consumers ´focus to the environment, health, and conservation of natural resources. The cold location of Finland has the advantage of lower pressure from plant diseases and pests over the South and Middle Europe. A drawback is that Finland has a short growing season and low temperature and therefore the variation of crop plants is limited. Although the growing season is short with one annual crop there are good possibilities to produce organic food with high microbial safety (MTK, 2017).

The increasing demand of organic foods has no sign of slowing. This opens doors to farmers to take the advantage of higher prices of organically grown crops. University of Helsinki, Finland, made a study including 840 organic farmers asking for the most important reasons for transitioning to organic production. The most common organic products of the farmers were flakes, flour, bread, vegetables, root crops, milk, and sour milk. The most important reasons for transitioning from conventional to organic production were economic, but the ecological ones and the sustainability were considered almost equally important as shown in Table 2. In order to increase the sales of organic food products, it is essential to achieve more diversify the products and ensure that products reach the consumer through their regional distribution (Himilä, 2016).

Table 2. Reasons for transitioning to organic production in Finland

Reason for engaging in organic production	The most important	The second most important
Lower production costs / increased profitability	**33.8**	16.0
Environmental sustainability	18.3	17.3
Healthy and clean	9.2	11.9
Better price	7.6	8.9
Higher subsidies	6.3	10.8
Other reason	6.3	5.5
The production was close to organic already	5.0	5.8
Took over the organic farm from parents	2.3	1.7
New challenges	1.9	5
Welfare of the animals	1.7	1.8
Demand pressure for organic food	1.1	2.4
Increased awareness of organic Production	1.0	2.3
Growing market	0.6	1.2

Data Survey: (Viitaharju *et al.*, 2017).

Best organic practices for farms in EU

Organic farming is a method to produce food that applies the best agricultural methods. However, they should be put practice under the package of local cultural, biological and mechanical means so that they support the integration of resources on farms and promote ecological balance and biodiversity (Tuck *et al.*, 2014) These practices include maintaining or improving the quality of soil and water resources while avoiding the use of artificial fertilizers and sludge, use of natural materials and processes, use knowledge on ecology to manage with pests and weeds, and keep in mind the biodiversity conservation when developing farming systems for crop and livestock growth (EU science hub, 2015; Gomiero *et al.*, 2011).

Crop yields and material and labour inputs are important in agriculture. A neglected side of farming is farmers' professional knowledge base. The organic farmers are, on the average, younger and better educated than the conventional farmers and endeavour for social and technological innovations. The strong knowledge base is achieved by co-operation between scientists and farmers (Jensen *et al.*, 2015; Röös *et al.*, 2018; Niggli *et al.*, 2016) While traditional experiences are often to the right direction, this knowledge can be strengthened with the most recent research. The crop rotation and optimal management of legume and green manure crops are essential to improve soil fertility, plant

nutrients, crop-weed competition, and control of diseases and pests (Niggli *et al.,* 2016; Preissel *et al.,* 2015)The use of tolerant or resistant crop varieties and use of certified and dressed seeds to control of diseases, as well as the control pests (i.e., natural enemies), are required to strengthen functional biodiversity, physical/biological methods like nets, traps, and repellents. Reduced tillage, adding supportive microorganisms and fungi in soil, can reduce weed and improve soil fertility (Niggli *et al.,* 2016; Lammerts van Buerenab *et al.,* 2011).

Challenges and opportunities of organic production in EU

Organic products are in conformity with the EU ś General Food Act and have safety standards such as other foods. Maintenance of high-quality organic products requires that farmers apply multi-annual crop rotations, disease-resistant varieties, and not use chemical compounds to control pests or weeds. Artificial preservatives and flavour enhancers are also forbidden. This is a challenge in production because organic farms in EU are often located in less favourable places where traditional farms tend to produce higher crops. At the same time, organic production requires more labour than conventional production and near or equal amounts of fossil fuels (Morison *et al.,* 2015) Organic products are usually packaged and distributed on a smaller scale and subject to specific controls and certifications (Berg *et al.,* 2018; Crowder and Reganold, 2015; Paul *et al.,* 2006). The higher prices enable organic farmers to continue production. Sometimes organic farms are affected by nearby farms which use pesticides or other chemicals and therefore the farmer cannot sell the products as organic. Organic companies seek to compensate this to farmers.

The demand for organic products is increasing rapidly in EU. When the supply does not meet the demands of consumers, the market is not balanced and the prices fluctuate and can often be artificially high sometimes favouring organic farming. Consumers can demand also more choices for organic products. Location-specific hybrid production strategies could be a solution to this problem by making organic food more mainstream. Studies in EU continue to ensure that organic foods taste better according to the opinion of the consumer (European Commission, 2016).

Organic farmers need specialized training for private processing, packaging, warehousing, logistics, and distribution. Such costs will be added to the price of finished products. Sometimes the presence of fake organic products appears to the market which is very harmful to the sector. Farmers may face difficulties in the transition from convention to organic the farm. Three-year transition period with lower product prices must be accepted before having a farm certified. Financial incentives to compensate for the transition period are available.

Challenges and opportunities of marketing for organic production in EU

One of the characteristics of organic agriculture in the EU is that it is a specialized sector. This creates a problem between the supply and demand and cannot satisfy the needs of consumers (Brzezina *et al.*, 2017). Moreover, agricultural production in general and organic in particular, requires the conversion industries to absorb the excess of production. When the volumes of organic products will increase, the industry certainly will deliver more capacity to the organic sector.

There is a lack of information on the economic performance of organic farms in EU. There is no reliable information system, despite the available support to farmers and food companies. There is little data on the domestic market, international trade, consumer prices, or production volumes in most EU countries. These are important points for increased investments in organic agriculture (Nikolic *et al.*, 2017).

There is the inefficiency of organic supply chains because they suffer from gaps between supply and demand. The reason for the gaps is the lack of information flow, high operating costs, the difference in supply-demand balance, lack of supply of information, poor cooperation among the members of the chain (Meredith and Willer, 2016).

Conclusion

Modern organic agriculture in many aspects follows the local traditional practices. However, it is the next generation approach both to the traditional as well as to conventional agriculture since organic agriculture exploits the newest outcomes of sciences, including biology, ecology, soil sciences, biochemistry, and even taking into account the recent climatic changes. Thus, modern organic agriculture is highly knowledge-based. This is reflected by the fact that it is mostly adopted by young farmers.

EU supports strongly the growth of organic agriculture by different subsidies and EU targets to significant increase in organic farming. Organic food categories and amounts have grown significantly during about 10 years. There are challenges especially in the concertation on the supply of products and demand of customers. Tools and networks to get the supply and demand to meet shall be developed. This will have many positive impacts on the desired increase of organic farming. Sustainability of some forms of organic agriculture has been questioned and should be considered. The emphasis should be put on the question of how a product is produced and not only on the product itself. The best agricultural practices are deployed in organic farming helping farmers to adapt to climate change by strengthening agro-ecosystems, improving soil

structure, water management, and water quality, diversifying crop and livestock production, and building farmers' knowledge base.

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