



Agriculture in Europe

Matthew N. O. Sadiku¹, Chandra M. M. Kotteti,² and Janet O. Sadiku³

¹Department of Electrical & Computer Engineering Prairie View A&M University Prairie View, TX USA

²School of Computer Science and Information Systems Northwest Missouri State University Maryville, MO 64468

³Juliana King University Houston, TX, USA

Email: sadiku@ieee.org; chandra@nwmissouri.edu; janetsadiku1@gmail.com

Abstract Because it is a cultural phenomenon, agriculture has varied considerably across time and space. Agriculture is an important industry for all EU countries and they all receive EU funds through the Common Agricultural Policy (CAP). It plays a central role, shaping EU landscapes, economies, communities, and cultures. Agriculture in Europe is dominated by livestock products, grains, vegetables, wine, fruits, and sugar. Europe has made its agricultural sector competitive and is a significant exporter of value-added products, such as processed food, meat, and dairy products. This paper focuses on farming practices in Europe.

Keywords agriculture, farming, Europe, European agriculture, traditional agriculture

1. Introduction

Agriculture is crucial for our present and future. It occupies a unique position at the heart of the European Union's society, environment, and economy. EU farmers are the backbone of Europe's food self-sufficiency, and vital drivers of jobs and sustainable growth in rural areas. There are around 10 million farms in the EU and 17 million people work regularly in the farms. EU farms used 157 million hectares of land for agricultural production in 2020, 38 % of the total land area of the EU. Figure 1 shows land belonging to farms by type of land (% share on total land area, 2020) [1]. Land competition, coupled with the expansion of forest and pasture areas, will limit the available land for arable crops.

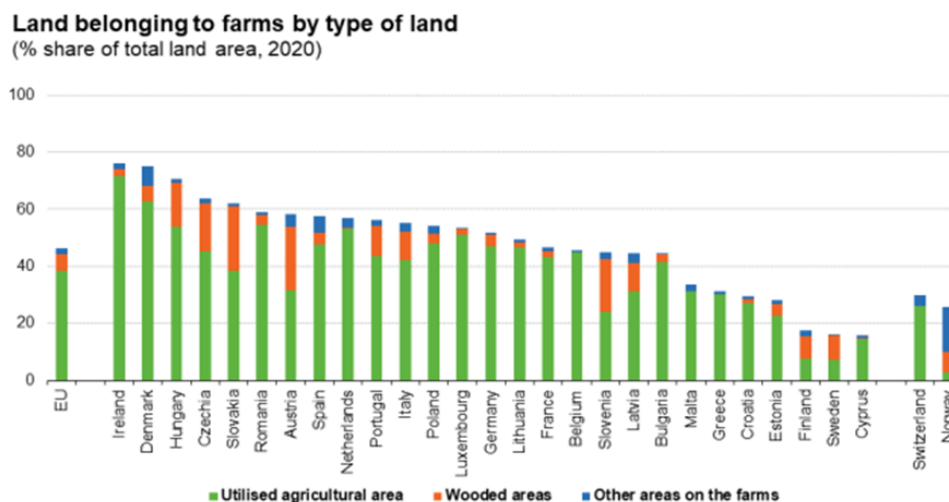


Figure 1: Land belonging to farms by type of land (% share on total land area, 2020) [1]



There are three distinct groups of farms in the EU: (i) semi-subsistence farms, where the focus is on feeding farmers and their families (ii) small and medium-sized farms that are generally family-run businesses and (ii) large agricultural enterprises or commercial farming, which is often regarded as production for cash. Mixed systems of agriculture have formed key elements of the landscape of Europe throughout historical times, and many such systems continue to exist today.

Agriculture in EU can be regarded as an economic sector contributing to economic growth and poverty alleviation. Agriculture and food-related industries provide over 44 million jobs in the EU. The EU is one of the world's leading producers and exporters of agricultural products. The EU will remain a net exporter of wheat and barley and a net importer of maize and rice. Figure 2 shows how much was produced in the EU in 2019 [2]. Romania had the most people employed in agriculture in 2019, while Germany had the most people employed in food production in 2018. For every euro spent, the farm sector creates an additional €0.76 for the EU economy.

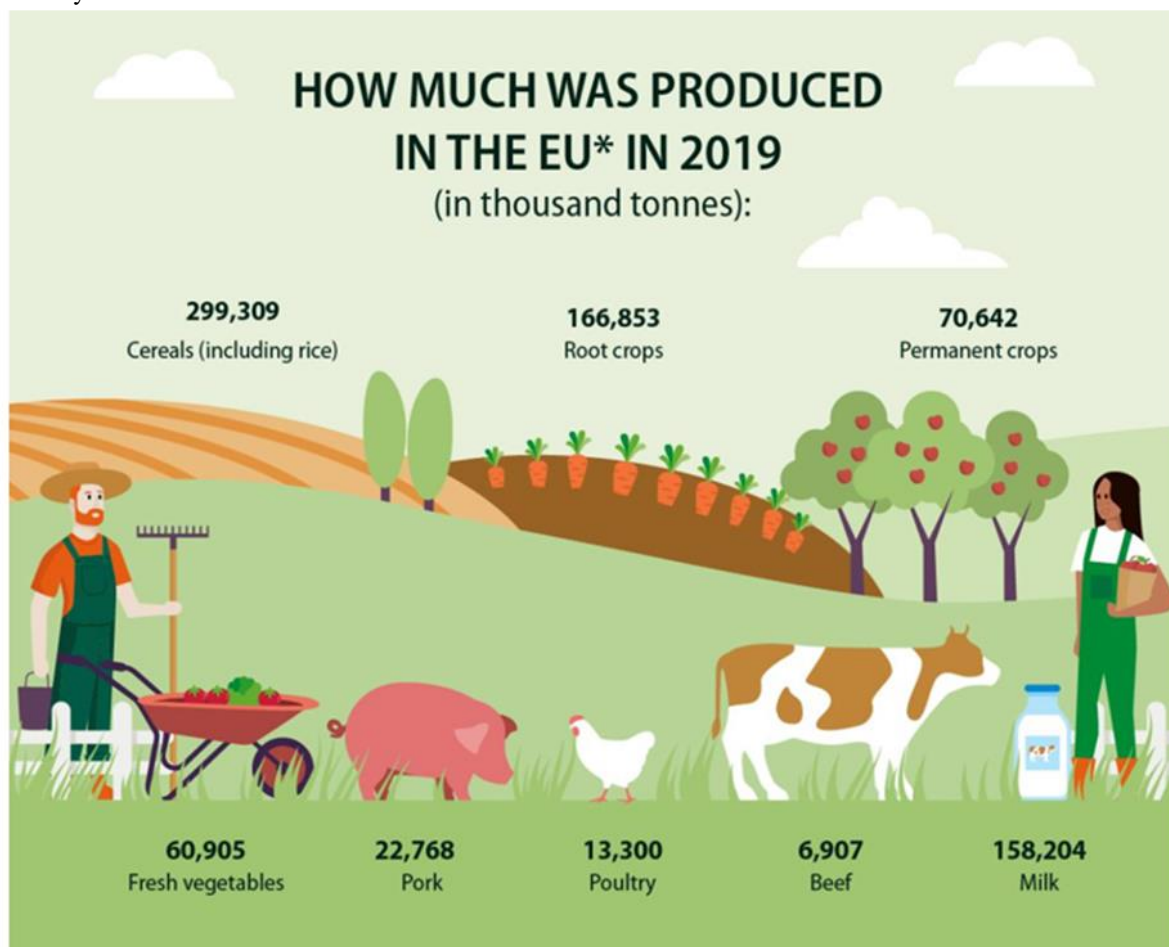


Figure 2: How much was produced in the EU in 2019 (*excluding the UK) [2]

Agriculture and the environment are interdependent. The quality of water, air, and the soil have a direct impact on the quality and availability of farm products. Soil health and biodiversity are particularly critical to agricultural production. Crops can be broadly categorized into two groups: annual and perennial. Annual crops are those that do not last more than two growing seasons. Annual crops can be subdivided in winter crops and spring and summer crops. Perennial crops (e.g. fruit trees and vines) last for more than two growing seasons, and are also termed permanent crops.

2. Brief History of European Agriculture

Agriculture began independently in different parts of the world. Eight thousand years ago, small bands of seminomadic hunter-gatherers were the only human beings roaming Europe's lush, green forests.



In Europe agriculture developed through a combination of migration and diffusion. The first farmers to enter Europe probably came with their families. They gradually learned which plants and animals thrived in Europe's temperate climates. The oldest sites with agriculture are along the Mediterranean coast. Agriculture spread through complex interactions between resident hunters and gatherers and agricultural peoples who were migrating into the region. As agriculture spread to more-temperate regions in Europe, practices that focused on cattle, pigs, emmer, einkorn, and legumes became important. By 6000 BP the transition to food production was under way in the British Isles, and by 5000 BP farming was common in western Europe.

Sumer, located in the southernmost part of Mesopotamia, was the home of one of the world's first civilizations. The land was cultivated by teams of oxen pulling light unwheeled plows, and the grain was harvested with sickles in the spring. By the beginning of Egypt's 4th dynasty, about 4525 BP, agriculture had become a sophisticated enterprise. In Spain the Moors introduced new crops and a new breed of sheep. Widespread expansion of farmed land occurred throughout western Europe between the 10th century and the later years of the 13th. A recession began toward the end of the 13th century [3].

Mechanization, the outstanding characteristic of late 19th- and 20th-century agriculture, has eased much of the backbreaking toil of the farmer. Just as World War I significantly lowered food production in Europe, so too did World War II. Agricultural production declined in most of the European countries. Through postwar assistance given primarily by the USA and the UN, recovery in Europe was rapid. Applications of electricity in agriculture did not increase greatly until the 1920s, when economic pressures and the increasing drift of labor from the land brought about a change in the whole structure of agriculture. From the second half of 20th century topicality and practices of urban agriculture are growing widely not only in social initiatives but also in scientific research.

3. Modern Agriculture

Agriculture is the activity of governing and managing ecosystems so that they deliver food products that meet our nutritional needs. Modern agriculture in EU can be regarded as a frontier of high-tech applications. There has been an enormous move forward towards understanding and adopting scientific technologies in agriculture. Different approaches should be taken to modernize European agriculture while respecting the traditions and demands of the rural population. There is no contradiction in using different approaches if they can help each other.

Modern European agriculture is best described by the following factors:

1. **Electricity:** Progressive farmers in a number of countries were determined to exploit the possibilities of electricity on their farms. Engineers and farmers have combined their effort in developing electrically powered equipment for crop conservation and storage to help overcome weather hazards at harvest time and to reduce labor requirements to a minimum. The impact of electric power on modern agriculture has been at least as significant as that of either steam or gasoline, because electricity in its nature is far more versatile than the earlier power sources. Conditioning and storage of such root crops as potatoes, onions, carrots, and beets, in especially designed stores with forced ventilation and temperature control, and of fruit in refrigerated stores are all electrically based techniques that minimize waste and maintain top quality over longer periods than was possible with traditional methods of storage [3].
2. **Urban Agriculture:** This is the practice of cultivating, processing, and distributing food in and around urban areas. Urban agriculture does not compete but help conventional agriculture with the many challenges. It has to become a complementary way to strengthen food systems in a near future. It comes in many forms and types (controlled and uncontrolled environment) and multifunctional outcomes. Uncontrolled environment agriculture (UEA) refers to open-space and on soil agriculture in urban areas such as vegetable gardens, rooftop gardens, community gardens or more traditional farms. Controlled environment agriculture (CEA) refers to any form of agriculture that controls and optimizes environmental conditions such as temperature, light or nutrient concentration. Examples of this kind of farming include modern greenhouses, vertical indoor farming, building-integrated agriculture, hydroponics, aquaponics, and aeroponics.
3. **Common Agricultural Policy:** EU agricultural policy covers a wide range of areas, including food quality, traceability, trade and promotion of EU farm products. In 2023, the European Commission



launched a 5-year (2023-27) support system for farmers in the form of a new Common Agricultural Policy (CAP). This includes funding and stronger incentives to help EU farmers adopt more sustainable, resilient practices. The CAP is a common policy for all EU countries. It supports farmers and ensures Europe's food security. Its aims are to [4]:

- support farmers and improve agricultural productivity, ensuring a stable supply of affordable food;
- safeguard European Union farmers to make a reasonable living;
- help tackle climate change and the sustainable management of natural resources;
- maintain rural areas and landscapes across the EU;
- keep the rural economy alive by promoting jobs in farming, agri-food industries and associated sectors.

CAP is built around three main goals to achieve a sustainable system of agriculture in the EU [5]:

- economic sustainability,
- environmental sustainability, and
- the social sustainability of farms.

To meet these three main goals, EU countries use a wide range of targeted actions, which aim to address each country's specific needs and make up CAP Strategic Plans. Through these plans, EU countries provide income support to farmers. All EU countries receive EU funds through the Common Agricultural Policy (CAP). Figure 3 shows how CAP fund is divided between EU nations [1].

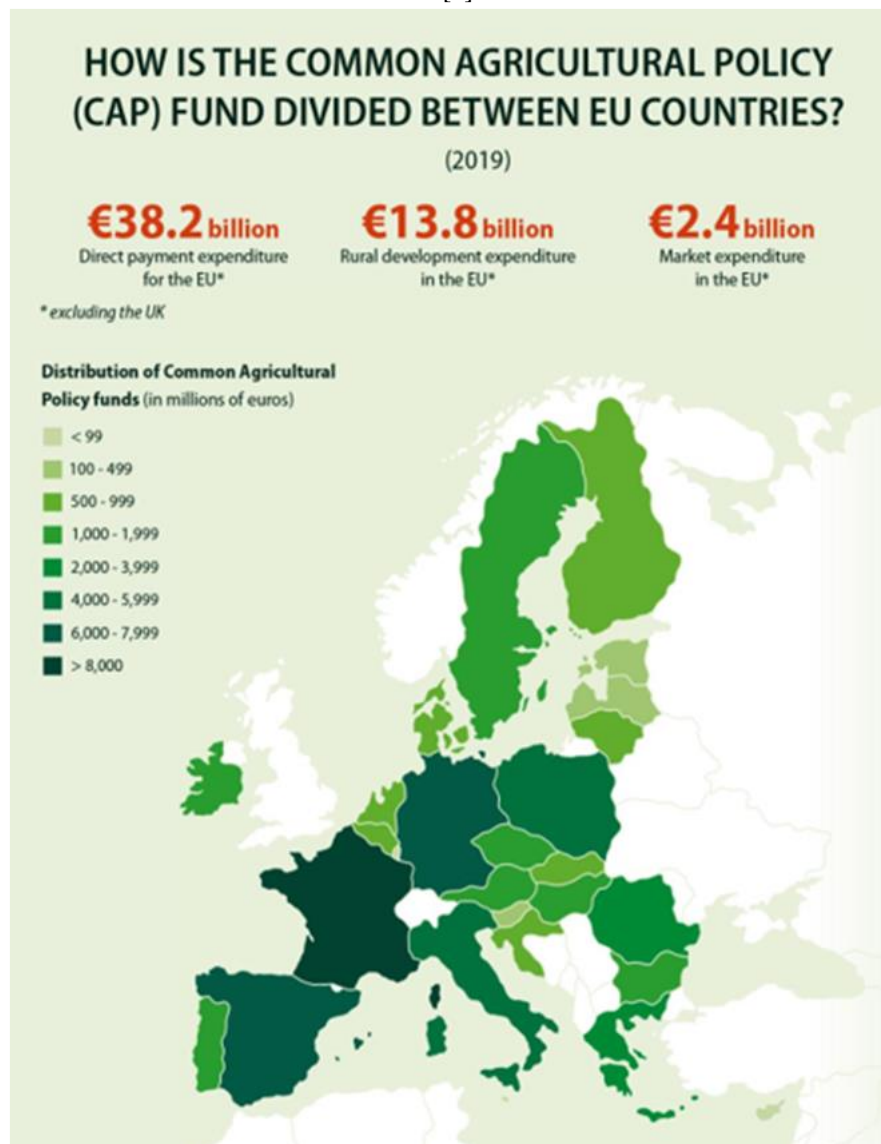


Figure 3: How CAP fund is divided between EU nations [2]



4. Benefits

Agriculture is closely connected to strategic issues such as food security and safety, and sustainability. Efficiency and productivity gains in agriculture have increased food production and improved access to it. The EU has legislated to ensure that the food produced and sold in the EU is safe to eat. EU agricultural policy covers a wide range of areas, including food quality, traceability, trade and promotion of EU farm products. Today's agricultural systems have succeeded in supplying large volumes of food to global markets feeding an ever-growing human population. Other benefits of European agriculture include the following:

- **Precision Agriculture:** This uses technological innovation, global positioning system (GPS) technology, and big data to accomplish two tasks. First, it is used to make the application of fertilizers, pesticides, and irrigation more efficient. Second, it is leveraged to manage inter- and intra-field variability.
- **Organic Farming:** Organic farming is a system of farming that is steadily gaining popularity in the world. Organic farming provides an alternative to the modern forms of farming such as using chemical fertilizers, genetically modified organisms (GMOs), growth hormones, and other artificial techniques. For most of its history, agriculture has been organic, without synthetic fertilizers or pesticides, and without GMOs. Organic agricultural land in Europe reached an all time high with 15.6 million hectares in 2018 [6]. Figure 4 shows a typical organic farming in Europe [7].



Figure 4: A typical organic farming in Europe [7]

Challenges

EU farmers face mounting challenges and crisis such as climate-change, water scarcity, soil degradation, seasonality, food supply chain during pandemic, fossil inputs costs, competitive global market, the demands of the global marketplace, decline in family farms, increasing average age of farmers, etc. EU farm policy has changed considerably in recent decades to help farmers face these challenges and respond to peoples' changing attitudes and expectations. The EU is seeking the best ways to support EU farmers, and adapt EU agriculture policies, with their needs in mind. Other challenges of EU agriculture include the following [8-11]:

- **Food Insecurity:** This is still a major issue worldwide. Even in Europe, currently more than 1 in 12 citizens cannot afford a meal with meat or fish. Inequality is a major driver of food insecurity in Europe and globally. Indicators of food security in the EU include self-sufficiency rates, net trade, diversification of imports and exports, and households' expenditure on food. Due to its exceptional agricultural resources the EU should play a key role in ensuring food security for the world at large.



- **Climate Change:** The agricultural sector is not only affected by climate change but also contributes significantly to it through the release of greenhouse gases. Climate change affects agriculture in several ways. Adverse impacts of climate change are already affecting agricultural production in Europe, especially in the south. Coupled with climate change, agriculture's pressure on the environment and natural resources undermines food systems today. Climate impacts have led to poorer harvests and higher production costs, affecting price, quantity, and the quality of farmed products in Europe. The EU can use the CAP as a tool to influence policy-making in the area of climate change.
- **Sustainability:** While being cost-effective, farmers should work in a sustainable and environmentally friendly manner. The current sustainability challenges call for technologies that can enhance plant protection against pests and extreme climate events. The EU financially supports its farmers and encourages sustainable and eco-friendly practices. The adoption of more sustainable farming practices will impact future development in the EU dairy sector. Sustainability will play an increasingly prominent role in EU meat markets. The European Green Deal and its farm to fork strategy represent a fundamental step towards achieving agriculture and food system sustainability.
- **Consumer Behavior:** This will also need to change. Changing diets, like eating less meat and reducing food waste would contribute to additional reductions. Traditional knowledge and behavioral change are vital to solving the current food system crisis.
- **Disruption:** The Russian invasion of Ukraine led to higher prices of inputs and energy. As a result, food inflation soared and trade was disrupted. Due to this disruption, there is a slowdown in the production growth of major EU agricultural sectors. Production of some crops is expected to stagnate, while milk and meat production would decline.
- **Demonstrations:** Across Europe, thousands of farmers have downed tools, mounted their tractors, and taken to the streets in protest. Farmers in different European nations claim that they are not being paid enough for their produce, are struggling with taxes and green rules, and face unfair competition from abroad. They express their concern that they are fed up with too much administration and rules telling them how they should farm. They are also worried that inflation has dramatically reduced the value of their direct payments. The demonstration by European farmers is shown in Figure 5 [12]. Southern Europe has so far been spared the brunt of the protests, but things may change soon.
- **Obesity:** EU citizens are increasingly affected by non-communicable diseases associated with dietary choices. The number of people who are overweight or obese is rapidly increasing in EU. Obesity alone is estimated to have caused about 2.8 million deaths per year.



Figure 5: Demonstration by European farmers [12]



Conclusion

Modern practices of industrial farming, such as mineral fertilization, have caused a widespread degradation of agricultural land and water bodies in Europe. Europe's farming sector is facing a big crisis and must profoundly change its practices. Men and women in EU farming must work together to secure food supply for the future. The European Commission is bringing together farmers, local food store owners, European retailers, consumer organizations, environmental groups, financial institutions, academia, and other key stakeholders to share ideas and listen to farmers' needs. The dialog is crucial for developing a joint understanding of the future EU farming and food system [7]. More information about agriculture in Europe can be found in the book in [13-25].

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About the Authors

Matthew N.O. Sadiku is a professor emeritus in the Department of Electrical and Computer Engineering at Prairie View A&M University, Prairie View, Texas. He is the author of several books and papers. His areas of research interest include computational electromagnetics, computer networks, and marriage counseling. He is a life fellow of IEEE.

Chandra M. M. Kotteti is an assistant professor in the School of Computer Science and Information Systems at Northwest Missouri State University, Maryville, MO. His current research interests include machine learning, deep learning, data science, and computer science.

Janet O. Sadiku holds bachelor degree in Nursing Science in 1980 at the University of Ife, now known as Obafemi Awolowo University, Nigeria and Master's degree from Juliana King University, Houston, TX in December 2022. She has worked as a nurse, educator, and church minister in Nigeria, United Kingdom, Canada, and United States. She is a co-author of some papers and books.

