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Sustainable Food Systems – Focus on Organic Farming of Fresh Fruits and Vegetables

Gabriel POPESCU
The Bucharest University of Economic Studies, Bucharest, Romania, popescug2004@yahoo.co.uk

Marian Catalin CUCU
The Bucharest University of Economic Studies, Bucharest, Romania, cmc.catalin02@gmail.com

Ioana PANAIT
The Bucharest University of Economic Studies, Bucharest, Romania, panaitioana48@gmail.com

Correspondence should be addressed to: Gabriel POPESCU; popescug2004@yahoo.co.uk

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Abstract

The paper is a theoretical study that focuses on the contribution of producers and consumers in its actions aimed at the sustainability of agriculture and is based on the presentation of the main characteristics of fruits and vegetables market in Romania and the particularities of the organic farming in Romania, both as integrated parts of the sustainable development of food systems. The paper includes quantitative research based on statistical data for the two categories studied to identify the size of the Romanian market and a comparison at the level of the European Union. Based on the studied data, an analysis was performed regarding the development potential of the fruits and vegetables market and organic farming in Romania, in accordance with the principles of sustainability.

Keywords: Agri-Food Supply Chain, Sustainable Development, Trends, Sustainable Food System

Introduction

The agri-food system is an integral part of the agricultural sector, the main function being to ensure this food, improvement is needed and ensuring sustainability is not optional. Given the importance of the food system, our study theoretically analyzes consumption and production trends that move towards sustainable considerations, highlighting the main specialized studies that strengthen the benefits of a diet rich in fruits and vegetables and the role of organic farming in the sustainable development of food systems and sustainable development that is based on organic farming as a vector of achieving sustainability. The focus of the paper is organic fruits and vegetables as part of a sustainable food system, both in terms of production and consumption of healthy diets. The quantitative part of the paper involves statistical analysis on the level of organic farming in Romania and the EU, with emphasis on areas cultivated with fruits and vegetables, making a parallel between conventional and organic production.

A sustainable food system is based on consumers who build their own values on sustainability, choice and responsible consumption while producers and agri-food companies are increasingly focusing on sustainable aspects in the development of their business. The resilience of agricultural production to the challenges of natural factors must be considered by producers while consumers must adopt sustainable consumption patterns. Companies must adopt in their strategies

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sustainable development to obtain prosperous economic and financial results based on the adaptation of social and environmental factors to specific aspects of sustainability.

A group of scientific researchers claim that the food system in the European Union (EU) does not meet the requirements of sustainability even if it offers food safety and security (European Commission, 2020).

At Community level, the design of a sustainable food system is considered, which is based on several tools as (Bureau et al.,2020; SAPEA, 2020; Arabska, 2021; Lotte and Bente, 2009) presented:

- Common agricultural policy (CAP)
- The EU Strategy "From Farm to Fork"
- The EU food safety policy principles
- The EU Biodiversity Strategy for 2030
-Agenda 2030 where most of the sustainable development objectives (SDGs) are applied in agriculture and in the agri-food sector.

For the sustainable development and improvement of the food system, the EU has designed the "From farm to fork" strategy based on food systems that are in line with environmental protection, as an essential pillar of achieving sustainability. The European Consumer Organization (BEUC) defines the sustainable product as having a process based on the principles of sustainability throughout the life cycle.

For a food system developed in accordance with the principles of sustainability, the following measures are recommended (Holden et al., 2018; Weber et al., 2020; Karwacka et al., 2020):

- the conversion of agriculture to an organic agricultural system and the increase of the share of the surfaces and of the organic certified production;
- rational use of pesticides to reduce pollution;
- reducing the carbon footprint and water through an integrated management;
- reducing food waste once by responsible purchases made by consumers and by reducing losses;
- a healthy balanced diet in which fruits and vegetables predominate.

The food system must consider ensuring food security by providing the necessary nutritional elements for the population and guaranteeing food security by implementing traceability on all stages of the supply chain considering the circular economy, finally all actions aimed at achieving sustainability.

The development of the agricultural system and the achievement of sustainability must start from agricultural production which must have a high ecological value with an emphasis on reducing the negative impact on the environment being agri-food products in accordance with the food values of consumers (Mylona et al., 2016). The authors (Horton et al., 2016) indicate in their study the importance of research in the development of food supply chains, starting from production to the final consumer and its choices.

It is important to be aware of the responsibility that the producer has in the cultivation and production of food. Starting, the first step in achieving a sustainable production is needing a market where the distribution and trade side is needed, a business environment adapted to the development of sustainable activities and, finally the consumer through its choices regarding food consumption, can move towards sustainable foods considering their multiple benefits.

Literature Review

Montanari et al. (2021) stated in their report that the EU agri-food supply chain and food system demonstrated a high degree of resilience since the beginning of the pandemic and has constantly adapted during the pandemic ensuring constant and uninterrupted access to food for the entire population at community level in accordance with food security.

The agri-food market is a dynamic and volatile one that requires conditions of continuous adaptation to new situations facing society (eg. pandemic period), to trends and consumer preferences but also to natural phenomena with an impact on the supply chain, especially production, phenomena that are difficult to control such as climate change, hail, drought, heavy rains and floods and that require innovative technologies to protect production (Pitesky et al., 2014; Fresco, 2009).
The Coronavirus pandemic impacted the market of fresh agri-food products according to Euromonitor Passport (2021), from two perspectives:

-consumers through the ethical spirit have become more concerned with the social aspects, especially those in rural areas by supporting small agricultural producers and local businesses and by increasing the consumption of seasonal products and products in their country with an emphasis on environmental protection.

- producers, especially the small ones, focused on the relationship with the final consumer at the same time adapting to the requirements of the period and following the development based on online services.

A comprehensive approach to sustainable development in which the emphasis is on the development of agriculture and further the agri-food system to be improved so as to integrate into its activities the pillars of sustainable development is essential to help strengthen and ensure sustainability. Sustainable performances in the activities specific to food systems represent an opportunity to reach the targets of sustainable development objectives with positive influences in the agricultural sector (DeBoe, 2020).

The paper aims to identify the potential for sustainable development of food systems through the practice of organic farming with a focus on fruits and vegetables as essential foods for diets, the importance of which is also stated by Food and Agriculture Organization (FAO) which has declared 2021 as the International Year of Fruits and Vegetables, that highlights their importance both in the diet of consumers with high nutritional value and for the local economy where the production and trade of fruits and vegetables are an important economic activity which is indispensable in the economy since ancient times. At the international level, the aim is to promote the benefits of fruit and vegetable consumption, the transfer of knowledge of good practices regarding production with emphasis on actions to prevent food waste, but especially the increase of consumption is considered.

In Romania, fruits and vegetables (FVeg) represent one of the main activities in agriculture, being a tradition to cultivate them especially in rural households, the market being divided between local production which is seasonal and high imports of both ultra-fresh and processed products.

Fruits and vegetables (FVeg) have two important attributes, being: food source and socio-economic source. FVeg represent 22% of global agri-food production (Grünwald, 2021) and have development potential because of promoting the consumption of fruits and vegetables for a healthy diet. FVeg are nutritionally rich foods with benefits on human health by consuming them, especially fresh, the indications of specialists from the World Health Organization (WHO) and FAO are to encourage consumption, the minimum required being 400 grams daily. Fresh FVeg are very perishable products, the storage and maintenance of the appropriate cold chain being essential elements for maintaining the product for a long period of time, but also to reduce food waste that is present throughout the supply chain. An adequate food diet is vital for any person, where accessibility to food and the necessary availability must be ensured both in quantity and quality. Given that globally malnutrition and unfair diets are factors that lead to death, it is important to improve diets and a high intake of fruits and vegetables ensures the necessary nutrients (GBD, 2016). FAO and WHO (2019) promotes Sustainable Healthy Diets which, in accordance with the principles of sustainability, aim at the environmental protection issues, so that foods whose production process is minimally invasive to natural resources and with a low level of greenhouse gas emissions, socially it must be available and safe for human consumption, and economically it must be accessible to everyone.

According to Keatinge et al. (2010), diversifying lifestyles with fruit and vegetable consumption provides long-lasting effects on human health and impacting local communities and economies. Fveg have health benefits and are a complex supply chain in a dynamic market that connects smaller or larger producers with the final consumer with the food needed for a healthy lifestyle. it is an opportunity to promote among producers and consumers the important role of fruits and vegetables and the awareness of their permanent need in world food security (Mook et al., 2013).

The results of a study conducted by Pem and Jeewon (2015) show that the consumption of fruits and vegetables is still low in many countries and one of the solutions to improve consumption is the strategy to promote the contribution to health.

Organic farming and all the organic agri-food products promote sustainability to a greater extent than conventional agriculture and is considered to be closely linked to the sustainable development of the agricultural sector and by adopting holistic approaches such as organic production (Rigby et Caceres, 2001; Smith et al., 2020; Muller et al., 2017). Organic food systems have good results in terms of environmental performance (Strassner et al., 2015) impacting the entire food system so organic farming is part of a strategy for agricultural development but is not fully sustainable (Scader et al., 2014). In order to ensure a stronger agricultural system that fully meets the criteria of sustainability, the organic fruit and vegetable sector is an essential element for guaranteeing sustainability and offering added value in the food diet in terms of superior beneficial characteristics. The organic fruit and vegetable sector in Romania has recently seen a significant increase and the change in food preferences towards the demand for organic products is growing (Radulescu et al., 2021).

Methodology

The methodology that was the basis of the paper consists in the use of quantitative statistical analysis, in order to highlight and determine the current situation regarding sustainable food systems with a focus on organic farming, using statistical data from international database such as FAOSTAT, EUROSTAT and national data from MARD. At the same time, a qualitative analysis of the different studies was performed according to the research topic.

The contribution of producers in achieving a sustainable food system

The food system and its components must consider alternatives to develop in a sustainable manner, the main actions being the reduction of food waste and plastic packaging through responsible purchases by the consumer while the manufacturer must establish a well-structured process on food losses during the technological process of production and obtaining agri-food products and the use of biodegradable packaging or from sources of recycled raw materials (Euromonitor, 2021). According to a study conducted by Euromonitor Passport (2021) at the level of food industries, it is found that sustainability and actions specific to achieving sustainability in business will intensify in the next 5 years. The World Farmers Organisation (WFO) stated that the farmers have a major role to play in sustainable food systems and producer organizations and agricultural cooperatives can enhance the role and capacity of farmers in sustainable development (WFO, 2020).

The contribution of consumers in achieving a sustainable food system

Euromonitor International (2021) conducted a consumer survey and the results of the study indicate that the main actions regarding social sustainability and environmental protection are reducing the use of plastic to the detriment of sustainable packaging and reducing food waste, which are in the top 10 consumer-specific trends in 2021, target the food sector and put pressure on the development of a sustainable agri-food system. Consumer actions tend to focus especially on two pillars of sustainability, respectively on care for the environment, also turning their attention to producers and the social part which in the Romanian rural area has an important contribution in the agricultural sector.

At the level of agri-food supply chains, the trends regarding consumer choices according to Euromonitor International's Lifestyles Survey (2020) are heading towards short chains and supporting local businesses.

Consumers have an important role to play in the harmonious development of the food system through the choices and actions they make daily regarding food consumption. A balanced lifestyle based on a healthy diet that includes a high share of fresh food and considering the recommendation of the WHO and FAO in 2003 on the daily consumption of at least 400 grams of fruits and vegetables contributes to creating a demand strong sustainable food.

According to the Eurobarometer 505, which consists of a questionnaire on consumers' expectations regarding food and food consumption. In figure 1 are the main considerations that consumers have in mind regarding food choices (European Commission, 2020).

Type of food product	The main features for consumers
Conventional	Taste
	Food safety
	Price
Sustainable	Nutritious and healthy foods
	Reduced consumption of pesticides
	Reasonably priced

Fig 1. Comparison between the main criteria of consumers in choosing conventional and sustainable foods

Source: Making our food fit for the future – Citizens' expectations, 2020

The results of the report The world market for fresh food (Euromonitor, 2021) present fresh products as beneficial for human consumption, especially consumed raw and little processed contributing to maintaining health. Given the importance of fresh products for the entire population, a food system is needed to aim for sustainability and ensure food safety and security. Adopting a healthy lifestyle for consumers and developing a range of healthy and environmentally friendly products that are produced responsibly are among the recommendations for a sustainable food system (Agostoni et al., 2021).

The food sector and the actors involved must adopt sustainable initiatives that transform the food system into a sustainable one with outstanding results in terms of sustainable development goals.

Romania's transition to organic fruits and vegetables - a step towards sustainable development

The transition to organic farming being a sector in continuous development worldwide, therefore, the production and consumption of food are ways to achieve sustainable agriculture. In Romania, organic agriculture is still at the beginning of the road. Figure 2 illustrated the total area from 2020 that is organic certified in Romania and the distribution on the 8 NUTS 2 development regions.

Fig 2. Distribution of organic certified areas by development regions in Romania

Source: MARD, 2021

In 2020, the total agricultural area on which organic farming is practiced represents 471,928 hectare (MARD, 2021). The South-East Development Region had the largest area, of about 133,856 ha, about 43% more than the second ranked region, the West Development Region. On the third place in the ranking of organic cultivated areas by regions is found the North-West development region, followed by the Centre development region, the North-East development region, the South-Muntenia development region, the South-West Oltenia development region, and on the last place being ranked the Bucharest-Ilfov development region. In 2020, Romania registered 23,066 (MARD, 2021) hectares of fruits and vegetables grown in organic system, increasing by 503% compared to 2010, while the total organic area increased by 157%. The share of cultivated areas with fruits and vegetables reached in 2020 a share of 4.9% for the total cultivated organic areas, starting from 2% in 2010.

At Community level, the latest data available according to Eurostat in 2019 shows that the EU28 average for the share of organic certified agricultural areas in the total agricultural areas was 7.7% while Romania was well below this average, registering 2.8%. In figure 3 are represented the first 3 countries with the highest and the lowest share of the organic area harvested registered in 2019.

Top	Austria	25.30%
	Estonia	22.30%
	Sweden	20.40%
	Romania	2.80%
Latest	Bulgaria	2.30%
	Ireland	1.60%
	Malta	0.40%

⟹ EU Target for 2030: 25%

Fig3. The share of the organic surfaces of the member states in 2019

Source: Eurostat, 2021

The EU target for 2030 is to stimulate the production and consumption of organic agri-food products and to reach 25% of organic certified agricultural area **(**Górska-Warsewicz et al., 2021). For Romania, this objective is an ambitious one that requires a sustainable strategy with immediate effects to be based on efficient national and community measures, but especially it needs producers willing to contribute to the development of the organic agricultural sector by adopting this type of agricultural system but also by diversifying crops and products.

In figure 4 it is presented the agricultural areas cultivated with fruits and vegetables, both in a conventional and organic system at the level of the main EU member states in 2019.

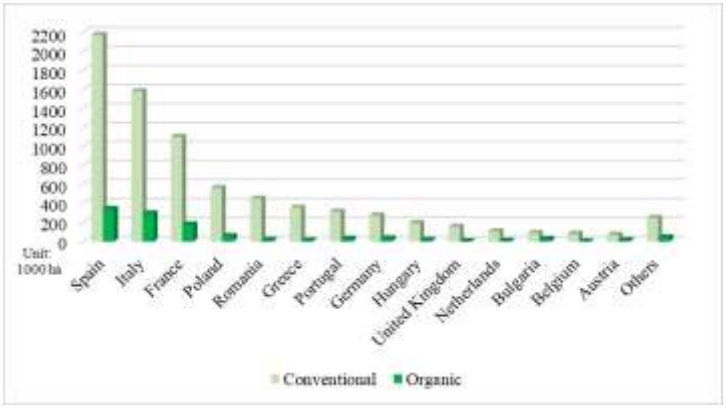

Fig 4. The ratio of cultivated areas with fruits and vegetables in a conventional and organic system in EU 2019

Source: Faostat and Eurostat, 2021

At the level of the European Union the situation of fruits and vegetables in terms of cultivated areas and production, the first four places in the ranking are occupied by Spain, Italy, France and Poland. The first three countries in the ranking (Spain, Italy and France) have about 62% of the total cultivated area in the community and 61% of the production recorded by it. At the opposite pole of the ranking are Estonia, Luxembourg and Malta with an insignificant contribution to the total production registered in the European Union, this fact being mainly due to the small agricultural areas of these countries (FAOSTAT, 2021). Romania is on the fifth position of the ranking that reflects the total area cultivated with fruits and vegetables (454,670 ha), but in terms of production it is in eighth place with a total production 20% lower than Greece, the country which has an area 21% smaller than Romania allocated to fruit and vegetable crops (FAOSTAT, 2021).

The ratio between conventional and organic agriculture is also unbalanced in the case of fruit and vegetable crops. At EU-28 level in 2019 Spain is the leader in terms of area cultivated with fruits and vegetables both in a conventional system (2177 thousand hectares) and organic (346 thousand ha). Italy ranks second in area with organic fruits and vegetables, with almost 300 thousand hectares, followed by France with 183 thousand hectares. Romania is in an outlying place compared to the total area cultivated with fruits and vegetables, it has about 17 thousand hectares cultivated organically, with a share of organic agriculture in this segment lower than other countries with low agricultural potential (Eurostat, 2021).

Several sustainability initiatives that actors need to consider are reducing food losses, reducing water and carbon footprint, reducing the use of plastic to the detriment of biodegradable materials, innovative green alternatives and eco-friendly solutions.

Conclusions

Several national, community policies, more effective and well-established instruments are needed to design and implement sustainable strategies for the sustainability of food systems. For a sustainable food system, it is necessary an integrated management applied in the production activity but also distribution and commercialization through sustainable supply chain management as part of the development strategy.

Following the results obtained for Romania, there was a progression of organic areas and at the same time an increase of areas cultivated with organic fruits and vegetables, but development strategies are needed to achieve the goal of organic farming, 25% of agricultural areas to be organic certified To achieve this goal, fruits and vegetables play an essential role which, through the importance given by the FAO in dedicating the year 2021, can contribute to achieving the sustainability of the food system in terms of diet, demand and supply.

The fruit and vegetable market is in continuous development in Romania but with multifactorial influences regarding the production but with beneficial effects following the daily food consumption. The resilience of the food system to global challenges is important and can be achieved through the synergy between the economic viability of agricultural production, fair incomes of producers and fair prices of agri-food products for consumers with eco-friendly actions from all actors in the supply chain and ensuring safety, security and accessibility of food for the whole society.

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