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ORGANIC AGRICULTURE IN TURKEY AND THE WORLD

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ОРГАНИЧЕСКОЕ СЕЛЬСКОЕ ХОЗЯЙСТВО В ТУРЦИИ И МИРЕ

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Abstract. Organic agriculture is an alternative production system that supports soil structure, fertility and conservation by protecting the ecological balance, using biological control methods against diseases and pests; based on the sustainability of living life, aiming for the highest yield with the maximum use of natural energy resources. In this context, it covers a different production process from conventional agriculture. While intensive input applications in conventional agriculture aim for the highest yield, organic agriculture prioritizes sustainability. Sustainable agriculture is defined as an agricultural practice that protects soil, water and biodiversity while meeting food, energy and natural resource needs. To ensure that organic agriculture contributes to sustainability goals, organic regulations need to focus more on environmental and best practices. Increasing demands day by day have positively affected the sustainability of organic agriculture. The common feature of most of the definitions of organic agriculture is that the products should be produced in accordance with the basic standards and that every stage from the land to the table is regularly controlled. The fact that every stage of organic agriculture is audited and documented, and that the practices operate in accordance with legal procedures are other noteworthy elements. These legal procedures provide protection at many points. Organic agriculture is not only limited to safe food production to protect human health; it is also an agricultural and ecosystem management that is environmentally friendly, effective in reducing ecological pollution, protection of water resources, prevention of erosion, protection of biodiversity, agricultural sustainability and agricultural development.

Аннотация. Органическое сельское хозяйство — это альтернативная система производства, которая поддерживает структуру, плодородие и сохранение почвы, защищая экологический баланс, используя методы биологического контроля против болезней и вредителей; основанный на устойчивости живой жизни, стремящийся к максимальной урожайности при максимальном использовании природных энергетических ресурсов. В этом контексте он охватывает производственный процесс, отличный от традиционного сельского хозяйства. В то время как интенсивное использование ресурсов в традиционном сельском хозяйстве направлено на получение максимальной урожайности, органическое сельское хозяйство отдает приоритет устойчивости. Устойчивое сельское хозяйство определяется как

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сельскохозяйственная практика, которая защищает почву, воду и биоразнообразие, одновременно удовлетворяя потребности в продовольствии, энергии и природных ресурсах. Чтобы гарантировать, что органическое сельское хозяйство способствует достижению целей устойчивого развития, органическое регулирование должно уделять больше внимания охране окружающей среды и передовым практикам. Растущие с каждым днем требования положительно повлияли на устойчивость органического сельского хозяйства. Общей чертой большинства определений органического сельского хозяйства является то, что продукция должна производиться в соответствии с основными стандартами и что каждый этап от земли до стола регулярно контролируется. Еще одним заслуживающим внимания элементом является тот факт, что каждый этап органического сельского хозяйства проверяется и документируется, а также то, что практика осуществляется в соответствии с юридическими процедурами. Эти юридические процедуры обеспечивают защиту во многих отношениях. Органическое сельское хозяйство не ограничивается только производством безопасных продуктов питания для защиты здоровья человека; это также управление сельским хозяйством и экосистемами, которое является экологически чистым, эффективным в снижении экологического загрязнения, защите водных ресурсов, предотвращении эрозии, защите биоразнообразия, устойчивости сельского хозяйства и развитии сельского хозяйства.

Keywords: organic agriculture, certification, environment, sustainability, health.

Ключевые слова: органическое сельское хозяйство, сертификация, окружающая среда, устойчивость, здоровье.

The rapid increase in the world population and the increase in food demand also led to an increase in the amount of chemicals used. This situation brings climate changes, negative effects on human health and consequently deterioration of ecological balance. Leaving a more livable world to future generations and the development of healthy generations has become a necessity that drives humanity to change. At this point, organic agriculture and organic nutrition have shown a tendency to emerge at this point and have realized a growth trend with the balance of supply and demand. The aim of this review is to explain the definition of organic food and its preferred production method; then to present the current situation in Turkey, as well as to evaluate its advantages and disadvantages, to highlight its ecological benefits and to guide investors in researching, developing and training strategies for the spread of organic agriculture in our country by showing the effects of health-oriented purchasing behavior.

Definition and Principles of Organic Agriculture

The increasing population and the increase in consumption have made conventional agricultural practices the most widely used production method in our country [8]. Today, conventional agricultural methods used to meet the food demand of the growing population have reduced the nutritional value and posed a risk to food safety and human health with the use of pesticides and fertilizers [29]. The use of excessive amounts of pesticides negatively affects product quality and yield by changing the microbial structure of the soil, and this poses a risk to food safety and human health [47].

Conventional agricultural practices also cause the destruction of natural resources and jeopardize food safety through intensive use of chemical inputs [27]. These methods, which are used to increase the amount of product with industrialization and population growth, have increased the risk of residue in foods, disrupted the nutrient balance and caused problems such as salination

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and salinization in the soil [30]. As stated, wrong agricultural practices have returned to us in the form of negative consequences such as deterioration of both human health and the balance of nature.

In order to eliminate these negativities and to produce and consume healthier products, conscious producers and consumers have put forward and developed the concept of Ecological Agriculture [35]. The concepts of ecological food or organic agriculture have been expressed in different ways by different scientists and institutions.

The definition of organic agriculture was approved by the International Federation of Organic Agriculture Movement (IFOAM) in Italy in 2008 as a result of long research. Organic agriculture is a production model that maintains soil, ecosystem and human health. This model is based on ecosystem-compatible processes instead of the use of harmful inputs, on cycles that are compatible with biodiversity and adapted to local conditions. Organic agriculture combines traditions, innovations and science to contribute to the environment, promote fair relations and improve the quality of life for all stakeholders involved [20]. In other words, the International Federation of Organic Movement (IFOAM) defines organic food, which is an ecological agricultural product, as nutrients produced from organic agriculture within the framework of certain criteria based on certain principles. These principles are based on concepts such as health, ecology, justice and care [33]. Organic agriculture is also expressed with different words such as biological, ecological, bio [26]. As an approach that integrates sustainable agricultural production in terms of human, environmental and economic aspects, organic agriculture aims to provide social and environmental benefits [2]. In this way, the application of green fertilization with organic agriculture enables agricultural operations to be carried out by maintaining the balance of soil microbiota, increasing soil stability and preventing erosion. At the same time, it reduces the use of pesticides in pest control or allows the preference of pesticides of natural origin. By prohibiting the use of genetically modified organisms, it is aimed to increase production quality and ensure food safety [47, 48].

Organic agriculture has many objectives, including preventing soil erosion, protecting water quality, increasing access to high quality products, protecting all life forms from the harmful effects of chemicals, providing employment in rural areas, supporting the revitalization of the economy and leaving a more livable world for future generations [39].

The general objectives of organic agriculture can be summarized as stated by Taşbaşlı and Zeytin [42]: To preserve the biological and mineralogical structure of the soil, to preserve genetic diversity by maintaining natural plant and animal life, to strengthen the natural balances between soil-human-plant-animal, to prevent all kinds of pollution caused by agricultural activities and to prevent climate changes, to eliminate harmful effects for life on the soil, not to harm the environment by working in harmony with nature, to increase agricultural production by using local resources, to produce sufficient and quality food with production planning, to support each other by carrying out plant and animal production together and to provide producers with a safe working environment and to ensure that they earn sufficient income.

Organic Food Production Process and Organic Production Standards

The most important elements that distinguish organic agriculture from other agricultural systems, especially in terms of marketing system, are legal standards and control and certification processes [43].

Article 33 of the Regulation on the Principles and Implementation of Organic Agriculture states that control and certification are the two main elements in securing the product. Control and certification procedures can be carried out by the same organization or by different organizations [7].

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The product certificate issued must contain certain information because the traceability of organic products is important. This information includes the name, code number, address, certificate number, name and characteristics of the product, product quantity, harvest year and certification status of the control and certification body [45].

The certification process includes the following steps;

Application: The farmer, processor, packer or final marketer applies to the certification body and explains all the activities and the project in detail. This application includes the amount of land, sketches, products to be grown, storage and packaging units, business address, land history and similar details.

Price Proposal: After the application is analyzed, the inspection company prepares a price proposal for the inspection and certification of the project and shares it with the economic operator. In the pricing process, the time to be spent in the control and certification process is taken into consideration.

Contract: A contract is mutually signed in which the economic operator undertakes to carry out organic production within the framework of the relevant standards.

Control: A control program is prepared according to all stages of the production process and the risks in these stages and a controller is determined. This control program is shared with the economic operator. The Regulation stipulates that controls should be carried out at least once a year. However, this frequency can be increased by assessing the risks related to the product and production. In addition, unannounced checks are also carried out regularly. The control phase consists of a series of steps; it starts with the inspection of agricultural production units, continues with post-harvest operations, storage, transport and subsequent processing, packaging and sales stages of the product are also part of the control process.

Historical Development of Organic Agriculture and its current situation in Turkey

In the 1800s, the world population was around 1 billion; however, it is projected to exceed 9.6 billion by 2050 [22].

Increasing population will deepen the problem of malnutrition by negatively affecting those who are deprived of food security, especially in underdeveloped or developing countries. In an effort to benefit from nature at the highest possible level in order to meet their nutritional needs, humans unwittingly wage war against nature. When humanity resorts to all kinds of methods to achieve its goal, these methods destroy nature and cause the number of many plant and animal species that have managed to survive as a result of natural selection to decrease or even disappear [21].

With the increase in the level of education, human beings have become aware of these inaccuracies in production, observed the damage to human health and ecological cycle and felt the necessity to do something. This idea has shed light on the emergence of the concept of organic agriculture. Historically, organic agriculture was initiated by some pioneering individuals and voluntary organizations in Europe and the USA [43].

Europe, one of these pioneering organizations, also developed the demand for organic food. With the increase in demand from European countries, organic production has diversified, and organic production projects have been initiated throughout Turkey since the mid-1980s [37].

The biggest foreign trade partner for organic agricultural products in Turkey is the EU countries [12].

Organic production in Turkey is increasing rapidly with the increase in international demands and with the support of the Ministry of Agriculture and Rural Affairs (MoAF), universities, research organizations, Non-Governmental Organizations (NGOs), domestic consumers and public interest.

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Developments such as the formation of a domestic market also support this increase [13, 24] Turkey, with its rich organic farming potential [19] and relatively low agricultural input use, is among the countries suitable for organic farming production worldwide (Table 1).

In Turkey, organic farming practices were first introduced to a limited number of grape growers in the Aegean Region by delegates of European organic farming companies [6].

Since most of the organic products grown in our country (more than 85%) are exported to foreign markets, organic production is shaped according to international demand [13].

This shaping is an important factor in the diversification of products. Based on this, there is an expansion in the range of organic products produced in our country in recent years. This product range extends from fresh fruits and vegetables to field crops (such as legumes, cotton and wheat), medicinal and aromatic plants, hard-shelled fruits such as pistachios, hazelnuts, walnuts and even dried fruits such as figs, apricots and grapes [5, 13].

Table 1

ORGANIC AGRICULTURE PRODUCTION DATA (INCLUDING TRANSITION PERIODS)

Years	*Number of Products*	*Number of Farmers*	*Cultivation Area (ha)*	*Natural Collection Area (ha)*	*Total Production Area (ha)*	*Production Quantity (tons)*
2002	150	12,428	57,365	32,462	89,827	310,125
2003	179	14,798	73,368	40,253	113,621	323,981
2004	174	12,751	108,598	100,975	209,573	377,616
2005	205	14,401	93,134	110,677	203,811	421,934
2006	203	14,256	100,275	92,514	192,789	458,095
2007	201	16,276	124,263	50,020	174,283	568,128
2008	247	14,926	109,387	57,496	166,883	530,224
2009	212	35,565	325,831	175,810	501,641	983,715
2010	216	42,097	383,782	126,251	510,033	1,343,737
2011	225	42,460	442,581	172,037	614,618	1,659,543
2012	204	54,635	523,627	179,282	702,909	1,750,126
2013	213	60,797	461,395	307,619	769,014	1,620,466
2014	208	71,472	491,977	350,239	842,216	1,642,235
2015	197	69,967	486,069	29,199	515,268	1,829,291
2016	225	67,878	489,671	34,106	523,778	2,473,600
2017	214	75,067	513,981	22,148	543,033	2,406,606
2018	213	79,563	540,000	86,885	626,885	2,371,612
2019	213	74,545	512,587	33,283	545,870	2,030,466
2020	235	52,590	353,783	28,882	382,665	1,631,943
2021	267	48,244	317,585	34,334	351,919	1,590,086
2022	268	44,927	294,580	16,004	310,584	1,600,858

Ecological agriculture started with the entry of foreign companies into our country and product diversity varies depending on foreign market demands. However, in recent years, the desire of conscious consumers for healthy and safe nutrition has contributed to the growth of the domestic market for organic products [18].

Among the first ecological products shipped were raisins and dried figs from the Aegean region; this start was later expanded to various geographies and products [11].

The export strategy of organic agricultural products in Turkey has changed over time. Initially, exported organic products were usually raw materials (Table 2). But recently, with the

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evolution of this approach, processed products have started to be exported. Some of the reasons behind this change include the advantage of longer shelf life and more lucrative trade opportunities [25].

Table 2

IN 2022 THE MOST EXPORTED ORGANIC PRODUCTS FROM TURKEY

Product name	Amount (kg)	Value ($)
Wheat and wheat products	10,647,979	7,122,423.60
Fruit juice	10,117,460	16,377,101.70
Fruit and fruit products	8,667,582	38,524,044.90
Fig and fig products	7,324,210	58,571,315.90
Grape and grape products	5,988,912	23,653,244.30
Apricot and apricot products	2,729,591	18,990,535.90
Hazelnut and hazelnut products	2,593,467	18,308,330.90
Animal products	1,406,679	1,827,145.60
Vegetables and vegetable products	792,083	1,792,787.90
Aromatic-medicinal spice plants	726,511	1,707,345.10
Olive and olive products	114,615	284,519.60
Grain and grain products	85,536	38,233.20
Oil crops and products	52,426	153,667.90
Puls	44,578	64,952.20
Others	28,705	47,247.30

Advantages and Disadvantages of Organic Agriculture

Conscious consumers abandoning conventional methods and switching to organic production brings with it a series of advantages and disadvantages. Of course, these advantages are of great importance for leaving a more livable world to future generations and for the development of healthier generations. Top of the Form Compared to conventional products, organic food products have many advantages [31].

Among these advantages, quality factors such as high nutritional value, high biological and technological quality; products generally have higher dry matter content (up to 25% higher dry matter content); products have more distinctive color, taste and odor characteristics stand out. Other advantages include the absence of pesticide residues, heavy metals and hormones [9, 44].

Among the benefits of organic agriculture, there are also important advantages such as economic growth, increasing the living standards of citizens and protecting the natural environment [1].

If we focus on the other advantages of organic agriculture; With the increase in product diversity and quality, the protection of soil fertility, the natural products obtained reduce environmental damage by not using chemical inputs and support the formation of organic matter in the soil. In this process, working conditions are improved and labour force is increased by providing necessary trainings. At the same time, natural resources are protected, a stronger economy is formed in domestic and foreign trade due to product diversity and income increases. Reliable food production is ensured, commercial value increases and exports are facilitated by the certification of agricultural products and the increase in quality standards. High-yielding products are obtained, while products with low pesticide residues and nitrate content are obtained. In addition, an increase in the amount of dry matter, antioxidant content and phenolic component content is observed with increasing vitamin/mineral content in the products [45].

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Of course, organic production has some disadvantages as well as advantages. There are difficulties in selling organic products in local markets due to the lack of awareness of organic agriculture. The basis of this situation is the insufficiency of promotion and awareness-raising activities and the scarcity of qualified personnel. In addition, the density of small fragmented agricultural lands causes traditional agricultural practices in nearby areas to negatively affect areas suitable for organic agriculture [23]. According to another study, the disadvantage of organic agriculture compared to conventional agriculture is the low product yield. According to research, this difference is between 15% and 25% [3, 36].

The main problems arising in organic production are [14]; high prices due to input limitations in organic production, infrastructure deficiencies in the sector and low awareness of organic products cause low domestic market demand. This situation results in producers who cannot export having to compete with conventional products. The fact that most of the organic production is export-oriented prevents the widespread use of healthy products locally. Along with the lack of producer awareness raising and technical support, the high costs of organic production certification and inspection also hinder the development of the sector. Insufficient awareness of organic production can sometimes lead to abuses such as the use of pesticides for profit.

Ecological and Environmental Benefits of Organic Agriculture

Due to faulty fertilization, problems related to the natural environment such as salt accumulation in the soil, heavy metal increase, nutrient imbalance, disruption of microorganism activities, nitrate accumulation, release of nitrogen and Sulphur-containing gases into the atmosphere and ozone depletion occur [40]. Excessive use of chemical pesticides and fertilizers, which are frequently used in traditional production, may increase the yield in production, but it gradually increases environmental damage and high cost [4]. The use of chemicals has caused irreversible damages to both human health and environmental conditions and their effects have gradually increased. As a result of this situation, it has been accepted that only yield-oriented production endangers human and environmental health and that it is more important for our future to adopt environmentally friendly production methods instead [16].

Organic agriculture contributes to the preservation of biodiversity, increasing the amount of organic matter in the soil and maintaining its productivity, preventing soil erosion and utilizing renewable energy resources [28].

Ecosystem-friendly agriculture is a production method that preserves the natural balance, maintains biodiversity, aims for the highest yield in production by using natural energy resources, controlled disease and pest control and sustainable soil fertility. It is also an agricultural production that harmonizes the trinity of 'nature, human and economic return' with sustainable agriculture [2]. Organic agriculture is an environmentally sensitive approach. Weed control in organic agriculture is carried out by cultural methods and mechanical tools. Since the use of pesticides is not in principle, such measures are taken and applied. In this context, hoeing is the most preferred method [15]. Organic farming is not only a method of obtaining healthy products defined by concepts such as natural, ecological, grown under natural conditions, hormone-free, free of chemical pesticides, synthetic fertilizer-free. It is also a production system in which every stage of production processes is legally inspected, recorded and certified. It is an ecologically and economically sustainable agricultural approach. In addressing the concerns of environmental protection and sustainable agriculture, organic agriculture stands out as an important solution for the agricultural future of countries [17].

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Organic Food, Health and Related Purchasing Behavior

Organic agriculture, which offers a new perspective in the agricultural system and provides a higher level of awareness, has increased people's desire to live a healthier life while protecting the ecological and natural balance [10]. The main purpose of this production model is to protect the health of all life forms in organic agricultural production [17]. Since organic food consumers are health conscious, they show interest in and prefer to buy healthy and natural foods [38]. Today, healthy lifestyle is emphasized with the principle of "back to nature" and adopted as a lifestyle [41]. In the literature examining the reasons for the preference of organic products, it has been revealed that health-related benefits are prioritized [32]. Most of the studies show that the health factor is decisive in consumers' intention to purchase organic food [38, 46, 49]. In another study, Makatouni [34] emphasized that the health factor is the main variable affecting the consumer's intention to purchase organic products.

Conclusion and Suggestions

Turkey has a great potential in terms of climate and soil fertility and is a country highly favorable for organic agriculture. However, the total agricultural area used for organic agriculture in Turkey is quite limited. In order for organic agriculture to be as effective and sustainable as in developed countries, this issue should be taken into consideration throughout the country and a common awareness should be created. In addition, misleading practices regarding the concept of organic products are observed in the market. Expressions such as "natural", "village product" or "pesticide-free" cause non-organic products to be marketed as organic. This situation damages trust and misleads consumers. Therefore, product naming and labelling should be subject to legal regulations.

Efforts should be made to raise awareness of consumers on how to distinguish organic products. Increasing the consumption of organic products is possible through training and promotional activities and these activities should be supported through written and visual media. Organic agriculture is important to protect the health of future generations, to use the soil more efficiently and to prevent erosion. With organic production, the effects of harmful synthetic chemicals on the ecological environment can be reduced. The protection of water quantity and quality is also possible with organic farming. For the development of organic farming, governments should encourage the domestic market, create labor needs and new employment opportunities, so that the export of organic products can contribute to the national economy.

This compilation provides guidance to organic food producers and consumers. It can also help to recognize the deficiencies in the sector, to take measures quickly and to raise conscious consumers.

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