Turkish Journal of Agriculture - Food Science and Technology, 11(10): 1791-1797, 2023
DOI: https://doi.org/10.24925/turjaf.v11i10.1791-1797.6130

Turkish Journal of Agriculture - Food Science and Technology

Available online, ISSN: 2148-127X | www.agrifoodscience.com | Turkish Science and Technology Publishing (TURSTEP)

Farmers' Views on Organic Grape Production in Adıyaman Province: Method Adoption and Problems

Aybüke Kaya[1,a,*], Songül Salık[1,b]

[1]*Hatay Mustafa Kemal University, Faculty of Agriculture, Department of Agricultural Economics, Hatay, Türkiye*
[*]*Corresponding author*

ARTICLE INFO

Research Article

Received : 03-04-2022
Accepted : 24-09-2023

Keywords:
Organic farming
Environment
Sustainability
Health
Marketing
Adıyaman

ABSTRACT

Healthy life in a sustainable environment is possible with accessible food production. The Covid-19 epidemic is a serious threat worldwide. This epidemic has revealed the importance of agricultural products. One of the most important areas of the epidemic affecting the whole world is exports; however, increased demand for agricultural products and exports in the epidemic process in Turkey. Turkey has a say in the trade of seedless dried grapes in the world. Seedless dried grape is on the healthy products list of the WHO. In 2019/2020, it had a share of 36% of world exports (with 246 thousand tons of export). This study was performed to evaluate their thoughts and farmers' problems with the adoption of organic farming in Besni district of Adıyaman. The research conducted in-depth interviews with the farmers producing organic grapes. Also, a face-to-face survey was conducted with 50 farmers. According to the findings, the land width of the farmers is not much. It has an average growing area of 37.52 decares. An average yield of 1.808 kg da^{-1} is obtained from this area. Serious differences have been found between conventional and organic farming. Moreover, government supports, high product prices, income, health, sustainability, and environmental protection are reasons farmers switch to organic farming. However, farmers argue that organic farming is less costly than conventional farming. Access to chemicals and marketing are major problems. As a result, farmers should be informed about organic farming. Additionally, it is thought that these studies will increase the productivity and product quality of the farmers. It is predicted that it will prevent rural to urban migration in the region.

[a] *aybukekaya.cu@gmail.com* *https://orcid.org/0000-0002-6866-1951* | [b] *sonaybay@gmail.com* *https://orcid.org/0000-0001-9873-0172*

Introduction

Agricultural activities are among the current topics in every period. Agriculture is indispensable in terms of its contribution to community nutrition (Kaya, 2021) modern methods are important in agricultural production. New varieties and appropriate input use are required. It is desired to ensure production efficiency and a higher yield per unit area. The implemented methods should ensure agricultural sustainability. In addition, it is necessary to protect the environment and human health. This view increases the tendency towards organic farming and organic products.

Organic farming is known as environmentally friendly in respect of agricultural sustainability. It preserves the ecological balance as it is applied within certain rules (Kaya, 2021). It is an ecologically intensive production system expanding worldwide as the demand for sustainability increases (Eyhorn et al., 2019). It is an agriculture method that aims to evaluate the future of humans and the ecosystem as an indivisible whole with healthy plant and animal production (Akkurt et al., 2018; Gülgör Doğan, 2017). It is an integrated agricultural system that is environmentally, socially, and economically sustainable (Lampkin, 1990; Willer et al., 2019). Farmers depend on reliable provisioning of yields, profits, and environmental services to ensure production system sustainability over time. Moreover, reduced yield variability is necessary to ensure reliable food access for consumers (Schmidhuber and Tubiello, 2007; Müller et al., 2018; Mehrabi and Ramankutty, 2019).

Today, there are serious increases in the growing area and production amount of organic products. Organic farming method is applied for many products in Turkey (Kaya, 2021). Organic farming in Turkey started in line with demands from EU countries in 1985. It only started with traditional products such as dried grapes and dried figs, in the early years. Today, it has reached a sectoral status with more than 200 products that can be classified as herbal products, processed food, and other organic products (Öztürk and Islam, 2014; Kaya and Bay, 2020). According to the report published by IFOAM and FIBL

Research Institute, the economic magnitude of the organic market globally is around $81.6 billion. Whereas the organic market share among the EU countries is around $27.1 billion. This would mean that one third of the global organic market network belonged to the EU countries (Merdan, 2019). The demand for organic food is especially concentrated in Western Europe and North America. Most of this supply is provided by developing countries. Organic product trade is possible with compliance with legal regulations and international standards. Due to its geographical proximity and strategic, Turkey should expand its share in the EU market for organic food trade (Gök, 2008). Organic production is most intense in Ireland, Italy, and Romania, respectively. On the other hand, Germany, the Netherlands, Italy, and France are among the countries that import organic products, while the countries that export the most organic products are Germany, Italy, and Poland. In addition, the findings of this study demonstrate that Italy is the country that adopted organic farming in the fastest and most organized way among the EU countries (Merdan, 2019).

The number of farmers engaged in organic farming in Turkey has been higher than 80.000 in recent years (Kaya and Bay, 2020). Consumer demand for organic farming and food products has naturally increased the number of farmers who adopt organic farming (Demiryürek, 2011). The number of farmers involved in organic crop production was 53,782 in 2019. In addition, there are 170 farmers engaged in organic animal production in Turkey. Organic farming also has an important role in world trade. Turkey has an organic product export value of over $ 200 million in 2019 (Kaya, 2021). However, Turkey's possible to be processed into products for the world market. Turkey has a competitive advantage. It has advantages such as geographical location, climate characteristics, product variety, soil quality, and a high labor force working in agriculture. It is necessary to increase the market share, raise the awareness of the consumer, and encourage the consumption of organic products. In addition, farmers should be provided with access to information sources and trained (Özbağ, 2010; Rehber, 2011). The attitudes of people demanding organic products must be measured and determined. Consumers using organic products and high-income consumers have more positive opinions about organic products. There are health factors, environmental protection factors, innovation, agricultural support, and economic factors (Kurnaz, 2020; Kaya and Bay, 2020; El Bilali, 2020).

There are differences between traditional and organic products, such as production costs, cost items, and profitability levels (Yercan, 2003). Traditional farmers want to switch to organic farming due to agricultural support. However, the loss of yield and lack of knowledge in organic farming negatively affect the transition to the method. Organic farmers have problems with the amount of support, marketing opportunities and access to technical information (Karabaş and Gürler, 2011). In order to achieve the desired growth in the sector, it is necessary to increase the farmer/consumer awareness level of organic farming. There is a need for agricultural policies that meet national/regional needs (Baysel, 2013). In Turkey, consumer awareness of organic products is also low (Özbağ, 2010). Turkey's share in the world organic farming sector is important in terms of both production and consumption (product type, production amount, export revenues and consumption amount) (Vatansever Deviren and Çelik, 2017). However, it is observed that the farmers are experiencing significant problems and the expansion is progressing slowly. In this context, sales and marketing emerged as the most important problem. In addition, disease and pest control are other important problems in production (Kızılaslan and Taner, 2011).

According to FAO, approximately 77.1 million tons of grapes were produced in 7.7 million hectares of area in the world in 2019. Turkey is the world's largest seedless dried grape producer and exporter. Approximately 60% of the grapes produced in Turkey are with seed, according to the Turkish Grain Board of Agricultural Sector Report in 2019. In 2019, 4.1 million hectares of grapes were produced in Turkey. There was a total of 4.1 million tons of grape production, of which 2.050.000 tons for the table, 1.599.000 tons for dried (369.000 tons with seeds, 1.230 tons without seeds) and 451.000 tons for wine. In the production period of 2020, grape production was realized as 4.2 million tons. Approximately 70-75% of seedless dried grapes produced all over the world are subject to international trade. The remaining part is consumed in the domestic markets of the producer countries. The domestic consumption of the producer countries is around 250-350 thousand tons. Turkey's seedless dried domestic grape consumption is 35-50 thousand tons. Dried grape is a product that can take a bigger share of the world's organic food market in the future (MAF, 2021). In organic grape cultivation, the provinces of the GAP region are important organic farming basins. The total organic fresh grape production amount of the GAP Region is 22.281,09 tons. Dried grape production amount is around 4.801,60 tons. A total of 27.082,69 tons of organic grapes are produced in GAP provinces. This production is 16,21% of the total organic crop in Turkey. There are 26 different organically produced products in the region. Among these products, besides the grape table production, it has begun to be marketed by transforming it into value-added products such as dried grape, grape juice, molasses, fruit pulp, grape sausage and cutting. Organic grape cultivation is carried out on 22.388 hectares in Turkey. Organic production is 13.961 ha, and 8.427 ha is in transition. According to the data from 2017, a total of 228.432,50 tons of organic grapes are produced in this area, of which 91.838,79 tons are organic and 136.593,71 tons are in the transition phase. A total of 1.285,30 tons of organic grapes, including 1.276,30 tons of fresh and 9 tons of dried grapes, were produced in Adıyaman in 2017. In the transition period, there is a total of 11.452,94 tons of grapes, 7.696,32 tons of fresh and 3.756,62 tons of dried grapes (Özdemir et al., 2019). Despite lower yields and greater yield variability, organic methods had similar costs to conventional methods and were more profitable due to organic premiums (Smith et al., 2019). In spite of lower yields and greater yield variability on organic farms, organic farms were more profitable, and had similar costs compared to conventional farms. This is likely due to the organic premiums received, which can vary with market conditions and mitigate the effects of lower yields (Crowder and Reganold, 2015). Farmers should be encouraged to do organic farming (Kızılaslan and Olgun, 2012).

This study was carried out in order to reveal the attitude, problems and views of grapes producing farms towards organic farming and innovations in Turkey.

Materials and Method

The main material of the research is the data obtained from organic grape farmers. The study was carried out in Adıyaman, one of the most important grape producers of the Southeastern Anatolia Region, in 2017. It was examined as an in-depth interview and survey. The farmer lists of the Besni District Directorate of Agriculture were used to collect the necessary data. Farmers who received organic farming support and engaged in grape growing were determined. A survey was conducted with the full count method according to these lists. This study was conducted with 50 certified organic grape farmers. In the study, the minimum number of farmers could not be reached, as the farmers is not in the farms Modern methods are important in terms of the efficient use of natural resources and ensuring sustainability in agriculture. The province of Adıyaman in the Southeastern Anatolia Region has great importance in this regard. The improvement of irrigation possibilities with the dam has been effective in determining the location. It is also effective to increase the use of new technology and production methods. Southeastern Anatolia Region contributes to the agricultural potential of Adıyaman province. It is mostly in the foreground with field and vineyard-garden agriculture. In the last 20 years, important changes have occurred in the product pattern and production method of Besni.

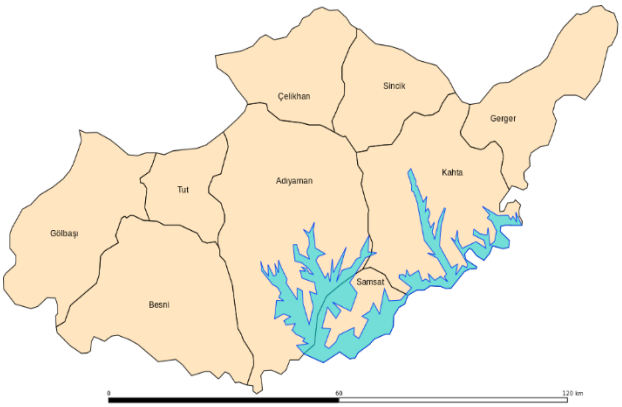

Figure 1. Location of the study (Anonymous, 2021)

The survey forms prepared were pre-tested. Data were collected after necessary arrangements. Field observations and group interviews were also used to develop and support the data set. The methods to be used in data evaluation were selected in accordance with the aims of the research. The analyzes were evaluated using the SPSS package program. The views of the farmers and the sources of information they use were analyzed with a Likert scale. The reliability of variables was measured with Cronbach's Alpha coefficient. In the SPSS program, reliability analysis is determined by the importance of the Cronbach alpha coefficient and the within-group correlation coefficient. The analysis is reliable when Cronbach's Alpha coefficient is between 0.60 and 0.80. This method is the weighted standard average of change (Özdamar, 1999; Kalaycı, 2016).

Results and Discussion

There were findings obtained as a result of face-to-face interviews with the farmers who voluntarily participated in the study. The average age of the farmers is 52, and more than 80% of them have received a primary school education. They are experienced individuals and consist of families with an average of 5 people. In addition, 70% of the farmers have social security. More than 40% of the farmers also have agricultural insurance in order to guarantee their agricultural products. It was determined that farmers' age average is high and their education level is low.

Land Use and Agricultural Activities

Most of the farmers in the region grow products such as grapes, pistachio, almond, wheat, barley and pepper. 56% of the farmers had a planting area of 30 decares or less. 20% of them had between 31-60 decares and 24% over 60 decares (Table 1). Merdan (2019) it was reported that according to data belonging to 2016, organic farming areas globally constituted 1% of the total agricultural area, whereas 6.7% of all the agricultural area was utilized as organic farming land in the EU.

Grape growing area of the farmers was between 4-128 decares. As seen in Table 2, the growing area was approximately 37.52 decares. The growing area of organic grape, which can be marketed as fresh and dried, was not very wide. In addition, it was determined that the yield of fresh grapes was low. Dried grape yield had an average value. Different grape varieties are also grown in the region.

The high production costs in the region were a challenge for farmers. Even if the cost of chemical pesticides was not much, labor and diesel cost were very high. Only sulfur was applied for plant protection in the region. The amount of inputs used by farmers varied according to the land size. Labor, which constituted the most basic cost, was determined as 61%, diesel 32% and protective products 7%. The state supports used in this context relieved the farmers a little. All of the farmers benefited from organic farming support. However, approximately 60% of the farmers found organic farming support insufficient. There were also farmers who benefited from diesel, fertilizer, animal husbandry and feed support. In addition, approximately 60% of the farmers had animal assets.

Regarding organic farming, 22% of the grape farmers were affected by the village headmen. Farmers usually stated that they did not know enough about the subject. In the study, nearly half of the farmers (51%) find medium level knowledge of organic farming. In addition, 30.6% of the farmers think they are knowledgeable about the method. Acıbuca et al. (2018) it was said that for the farmers to whom the survey was applied, the most significant problems observed are marketing, absence of contract production, the used pesticides' being ineffective and the lack of information on growing methods. It is thought that farmers have a low income because they keep doing organic farming in order to benefit from agricultural support in spite of having significant problems; they do not have any production methods and the ability to cope with diseases and pests. That they are not aware of the possibility of benefiting from the information acquisition sources when a single problem is faced, makes the need for raising the dissemination activities for farmers.

Table 1. Distribution of farmers by grape cultivation area (%)

Grape growing area (da)	Frequency	%
30>	28	56
31-60	10	20
60<	12	24
Total	50	100

Table 2. Farmers' average values for grape production

Area (da)	Yield (kg da^{-1})	Price (₺ kg^{-1})	Type (da)		
			Property	Rent	Sharecropper
37.52	1808.40	7.46	40.83	37.67	-

Table 3. Farmers' knowledge level regarding good agricultural practices

Good agricultural practices	Frequency	%
Be informed	14	28.0
Not be informed	36	72.0
Total	50	100.0
Knowledge level	Frequency	%
Little	7	14.0
Middle	5	10.0
Very	2	4.0
Declarative opinion	14	28.0
Not declarative opinion	36	72.0
Total	50	100.0

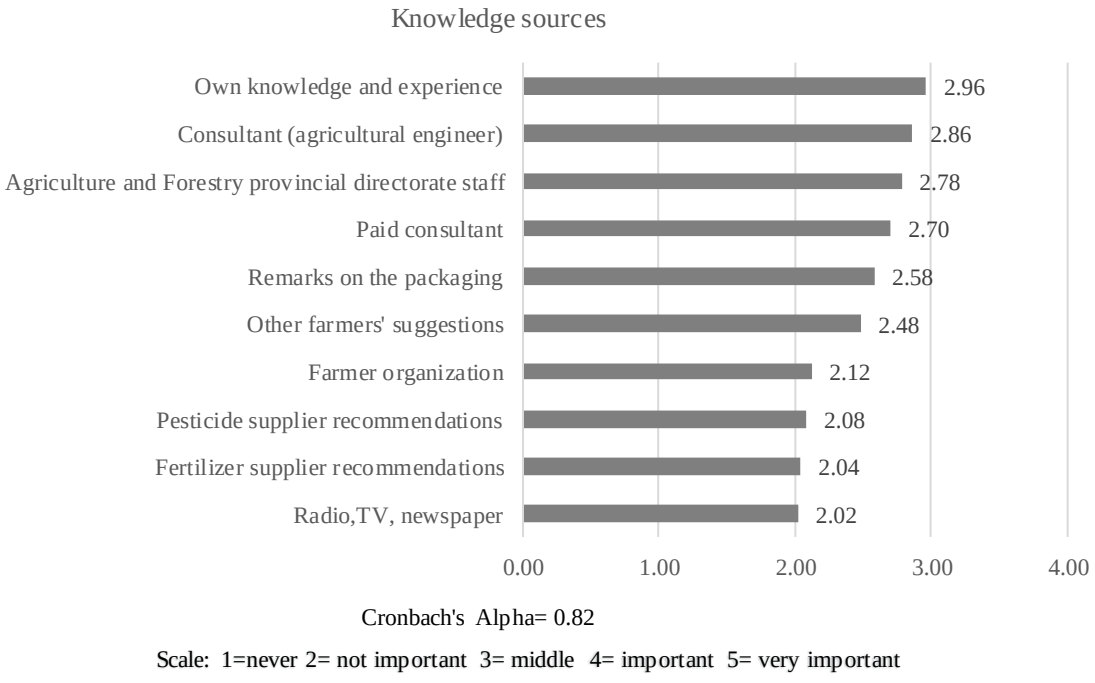

Figure 2. Knowledge sources used in dose adjustment in agricultural inputs

Farmers' Reasons for Adopting Organic Farming

Many factors affect the transition to organic farming for this region, as in the world. These factors are generally encountered in terms of economic as well as environmental and social. The study determined that farmers benefited from organic farming support, which was one of the important reasons for the transition to organic farming. Health, environmental awareness and income growth follow, respectively. In addition, gaining experience in organic farming, having a certificate and setting an example for other farmers are among the reasons that affect the transition to organic farming. İpek and Yaşar Çil (2010) it was stated that with the increase in global pollution, a number of regulations are made for organic farming at both international and national levels. Acıbuca et al. (2018); Karabaş and Gürler (2011) it was determined that the low agricultural incomes of the farmers are also effective in the development of organic farming activities in the region. In addition, the absence of control and certification organizations and companies marketing organic products limits the sources of information for farmers.

Farmers' views regarding good agricultural practices

Good agricultural practices (GAP) are also important for human health and the environment. It is a different growing method like conventional farming and organic farming. However, the farmers in the region did not know much about the GAP. Approximately 2/3 of the farmers stated that they did not have information the GAP. In addition, as seen in Table 3, the knowledge level of the farmers on good agriculture practices was low and medium. Most farmers did not comment on the GAP because they did not have sufficient knowledge (Table 3).

Knowledge Sources Used in Dose Adjustment in Agricultural Inputs

Farmers act according to different knowledge sources while adjusting the dose of agricultural inputs. They usually rely on their own knowledge and experience of the past years. Other knowledge sources are given according to the level of importance in Figure 2.

Farmers' views on Organic Farming

The views of the farmers on organic farming are given in Table 4. It was understood that organic farming contributes significantly to the region's economy. It was also an advantage that the products were generally demanded by all consumers. Moreover, it prevented migration from rural to urban (Table 4). Kahveci and Ataseven, (2020) it was said that farmers engaged in organic farming come together with organic markets and other organizations. Thus, they both increase their income and offer solutions to consumers' wishes. Organic farming has some fundamental problems that limit development in Turkey. The most important of these problems is that farmers engaged in organic farming cannot be organized. Müller et al. (2018) it was determined that low variability allows farmers to achieve consistent production and avoid unprofitable years while ensuring that consumers have reliable access to nutritious and sufficient food. When farmers are able to generate consistent crop yields, food prices are also less volatile and global trade markets are more stable.

Problems Encountered in Grape Growing

There are problems faced by farmers in grape growing. The most important problems are labor, lack of sufficient markets and buyers, low product prices and insufficient state support (Table 5). Karabaş and Gürler (2011) it was stated that there are many factors in the fact that conventional farmers do not want organic farming. These factors are the loss of yield in organic farming, lack of knowledge about organic farming and not making market oriented production. Organic farming producers were determined to have problems regarding the lack of incentives and market place. In addition, there are problems accessing technical information about organic farming.

Low cooperation and organization among farmers is also an important problem. The lack of membership of the farmers in any union or cooperative increases the problems. As a result of the study, it was determined that 90% of the farmers do not have such membership. Others were members of the Chamber of Agriculture, the Agricultural Credit Cooperative and the grape farmers' association they have established with their local means. In addition, farmers had a marketing problem. Due to poor organization, they sold their products at a lower price. For this reason, 34% of the farmers sold to the merchants who come to their villages. In addition, 44% of them found the opportunity to sell to brokers and 22% to the public market (Figure 3). Karabaş and Gürler, (2011); Peeters et al., (2020) it was said that organic farming support should be increased, and farmers should be supported in providing market places for local governments.

Table 4. Farmers' views regarding organic farming

Views	Means	Cronbach's Alpha
It contributes to the economy of the region	2.94	0.73
Demanded by all consumers	2.80	
Organic farming prevents rural-urban migration	2.78	
Organic farming farmers have higher incomes	2.66	
Input prices are high	2.56	
There is a problem of fighting diseases and pests	2.48	
Organic farming is more costly than conventional farming	2.42	
Organic products have a marketing problem	2.40	
Difficult to access pesticides used in organic farming	2.34	
Organization and cooperation between farmers is insufficient	2.32	
The region is not suitable for organic farming	2.04	
There is no difference between organic products and traditional products	1.64	

Scale= 1=Not agree; 2=Partly agree; 3=Agree

Table 5. Farmers' views on problems encountered in the grape growing

Problems	%
Not finding sufficient markets and buyers	88
Water supply and irrigation problem	54
Low product prices	88
Disease and pest control	80
Labor problem	90
Lack of government support	76
Finding suitable regions for organic farming	30

*More than one option is specified (%).

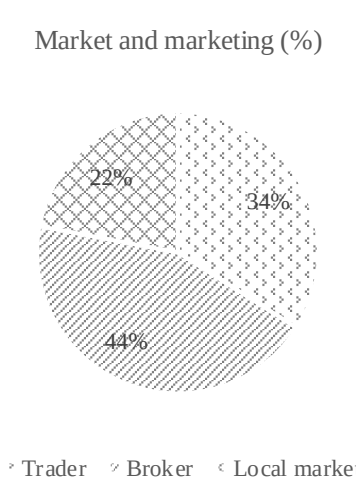

Figure 3. The way farmers' market their products (%)

Demiryürek, (2011) it was determined that most of the current organic production is exported mainly to the EU countries and the domestic market has been growing. Though, Turkey has suitable ecologic conditions and export potential for organic production, the share of Turkish organic products in the global market is significantly low.

Conclusion

Vineyard, pistachio, fruit growing, almond and olive cultivation are common in the region. The soil structure of the region and suitable climatic conditions allow it to grow more than one crop. Local farmers should follow all financial support and opportunities to improve organic production. The region's people should be raised awareness of the importance of natural resources. The low level education of farmers affects their adoption of innovations. Farmers do not have enough information about organic farming. It has been determined that those who know about organic farming are also lacking in scientific terms. Farmers acquired the knowledge mostly from relatives, leading farmers and courses. Farmers must be informed about the environment and health. The use of information technologies in agriculture should be increased. Computer and internet usage should be expanded. Training programs should be organized regularly in terms of spreading innovations. Agricultural extension activities should be increased. All of the farmers benefit from organic farming support. However, approximately 60% of the farmers find this support insufficient. Agricultural and environmental sustainability should be supported. Market and marketing, low product price, and water and irrigation problems are among the most important problems. The organizational status should be strengthened by increasing cooperation between farmers. Products should be marketed with added value. There is a need for a packaging facility in this area. Domestic and foreign organic markets should be expanded. Farmers should open up to international markets as well as government subsidies. It should not be forgotten that all studies on this issue will greatly contribution to the global economy, primarily the regional economy.

References

Acıbuca V, Eren A, Bostan Budak D. 2018. The Faced Problems of Organic Farming Producers (Sample of Mardin Province), Journal of Bahri Dagdas Crop Research 7(2): 39-46.

Akkurt M, Şenses İM, Erdoğan Ü. 2018. Organic viticulture recent status in Turkey and development, Turkish Journal of Agriculture-Food Science and Technology, 6(11): 1511-1516.

Anonymous, 2021. Figure 1. Available from: https://tr.wikipedia.org/wiki/Besni Accesed: 26.02.2021.

Baysel B. 2013. Türkiye'de organik tarım üretiminin önemi ve tarımsal ürün ihracatı içerisindeki payı. Istanbul Trade University, Institute of Social Science, Istanbul.

Crowder DW, Reganold JP. 2015. Financial competitiveness of organic agriculture on a global scale. Proc Natl Acad Sci U.S.A. 112, 7611-7616. doi: 10.1073/pnas.1423674112.

Demiryürek K. 2011. The concept of organic agriculture and current status of in the world and Turkey, Journal of Agricultural Faculty of Gaziosmanpasa University, 28(1), 27-36.

El Bilali H. 2020. Organic food and farming in West Africa: A systematic review. LANDBAUFORSCH J Sustainable Organic Agric Syst ·70(2):94-102, DOI:10.3220/ LBF1611507579000.

Eyhorn F, Muller A, Reganold JP, Frison E, Herren HR, Luttikholt L. 2019. Sustainability in global agriculture driven by organic farming. Nature 2, 253–255. doi: 10.1038/s41893-019-0266-6.

Gök SA. 2008. An Assessment of Trade in Turkish Organic Products in The Expanding Market of European Union, Expertise Thesis, The Turkish Republic Ministry of Agriculture and Rural Affairs, Department of External Relations and EU Coordination, Ankara.

Gülgör Doğan E. 2017. Economy of organic farming and consumer trends, MSc. Thesis, Namık Kemal University, Graduate School of Natural and Applied Sciences, Department of Agricultural Economy, Tekirdag.

İpek S, Yaşar Çil G. 2010. Organic agriculture and state subsidies in the dimension of international trade, Journal of Entrepreneurship and Development, (5:1), 135-162, Canakkale.

Kahveci Ş, Ataseven Y. 2020. Investigation of organizational models in organic agricultural production in Turkey, Third Sector Social Economic Review 55(4), 2341-236, doi: 10.15659/3.sektor-sosyal-ekonomi.20.11.1451.

Karabaş S, Gürler AZ. 2011. A comparative analysis of organic farm and conventional farm, Karamanoglu Mehmetbey University Journal of Social and Economic Research, 13 (21): 75-84.

Kalaycı, Ş. 2016. SPSS Uygulamalı Çok Değişkenli İstatistik Teknikleri, Asil Publishing, 7nd Edition, Ankara.

Kaya A., Bay S. 2020. Organic Grape Production and Producer Status in Adıyaman Province; Example of Besni District. Turkish Journal of Agriculture -Food Science and Technology,8(9): 1988-1993.

Kaya, A. 2021. Organic farming and policies applied in Turkey.

Kızılaslan H, Taner L. 2011 Technical and economical problems of producers in organic and conventional greenhouse vegetable production (The case of Sivas province, Ulaş district), Journal of Agricultural Faculty of Gaziosmanpasa University, 28(2), 135-143.

Kızılaslan H, Olgun A. 2012. Organic agriculture and supports given to organic agriculture in Turkey, Journal of Agricultural Faculty of Gaziosmanpasa University, 29 (1), 1-12.

Kurnaz V. 2020. Factors Affecting Organic Plant Production Preference: The Research of Ankara Provınce, Ankara University, Graduate School of Natural and Applied Sciences, Department of Agricultural Economics, Ankara.

Lampkin N. 1990. Organic Farming. Ipswich: Farming Press.

MAF, 2021. Agricultural products markets-Grape, Republic of Turkey Ministry of Agriculture and Forestry, Agricultural Economic and Policy Development Instute, Available from: https://araştirma.tarimorman.gov.tr/tepge, Accesed: 27.02.2021.

Mehrabi Z, Ramankutty N. 2019. Synchronized failure of global crop production. Nat Ecol Evol. 3, 780–786. doi: 10.1038/s41559-019-0862-x.

Merdan K. 2019. Current situation and development potential of organic agriculture in European Union countries, Eurasian Journal of Researches in Social and Economics, 6(1): 167-186.

Müller C, Elliott J, Pugh TAM, Ruane AC, Ciais P, Balkovic J. 2018. Global patterns of crop yield stability under additional nutrient and water inputs. PLoS ONE 13:e0198748. doi: 10.1371/journal.pone.0198748.

Özbağ BC. 2010. Economic Analysis of Organic Farming in Turkey, Uludag University, Insitute of Natural and Applied Science, PhD Dissertation, Bursa.

Özdamar K. 1999. Paket Programlar ile İstatistiksel Veri Analizi I. Eskişehir, Kaan Kitapevi.

Özdemir G, Sessiz A, Çetin Ö, Bolu H, Güler A. 2019. Organik Üzüm Yetiştiriciliği, Nobel Publishing, Istanbul.

Öztürk D, İslam A. 2014. Marketing of organic products in Turkey, Journal of Social Science Studies, I, (2014): 75-94.

Peeters A, Lefebvre O, Balogh L, Barberi P, Batello C, Bellon S, Gaifami T, Gkisakis V, Lana M, Migliorini P, Ostermann O, Wezel A. 2020. A Green Deal for implementing agroecological systems: Reforming the Common Agricultural Policy of the European Union, LANDBAUFORSCH · J Sustainable Organic Agric Syst · 70(2):83-93, 10.3220/LBF1610123299000.

Rehber E. 2011. Organik Tarım Ekonomisi. Bursa, Ekin Basım Yayın Dağıtım.

Schmidhuber J., Tubiello FN. 2007. Global food security under climate change. Proc Nat Acad Sci U.S.A. 104, 19703-19708. doi: 10.1073/pnas.0701976104.

Smith OM, Cohen AL, Rieser CJ, Davis AG, Taylor JM, Adesanya AW, Jones MS, Meier AR, Reganold JP, Orpet RJ, Northfield TD, Crowder DW. 2019. Organic farming provides reliable environmental benefits but increases variability in crop yields: A global meta-analysis, Frontiers in Sustainable Food Systems, Vol 3, Article 82, 1-10, doi: 10.3389/fsufs.2019.00082.

Vatansever Deviren N, Çelik N. 2017. Evaluation of economic aspects of organic agriculture in the world and Turkey, The Journal of International Social Research, 10(48): 669-678.

Willer H, Lernoud J, Kemper L. 2019. The World of Organic Agriculture, eds H.Willer and J. Lernoud. Frick: FiBL.

Yercan M. 2003. Agricultural Cooperatives, Ege University Agricultural Application and Research Center, Farmer Brochure:34.