



REVIEW ARTICLE

Organic Agriculture Potential of Eastern Black Sea Region

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ABSTRACT

Mankind caused a lot of harm to their environment unintentionally during agriculture. Thus nowadays production techniques that are compatible with nature, making the right use of the resources, targeting sustainable development, looking after animal welfare are beginning to spread throughout the world. Especially organic agriculture among those techniques gained a seat as it depends on customer preference. Organic agriculture that has the following five fundamental features: compatibility to nature, self sufficiency, sustainability, welfare, traceability began with the production of dried grape, dried figs, dried apricots and nuts in our country during the 1980s with the contractual agriculture system intending to export. During the following years, hardshell and dried fruits, frozen fruits and vegetables, fresh fruits and vegetables, spices and legumes followed the previous ones in export. Also, production and exportation of rose water, rose oil, olive oil, cotton and textile products increased considerably. In our country where there is a wide variety of products for organic agriculture, in eastern black sea region tea and nuts are the most cultivated products. Organic agriculture is carried out in every province of the region, the contribution of provinces in percentage as follows: Rize 42%, Ordu 25%, Artvin 13%, Trabzon 10%, Gumushane and Giresun 5%. Organic stock raising is done only in Gumushane and Ordu. Gümüşhane has the most promising potential for organic stock raising.

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Introduction

In order to obtain maximum yield from agricultural activities from the beginning until today, intensive agricultural practices were focused on in monocultural way, and those practices increased continuously which led to usage of mineral fertilizers and synthetic pesticides. With those practices; problems such as reduction in organic substances in soil, extinction in soil microorganism activities, soil erosion, increase in disease and harmful factors, rise in environmental pollution and destroy in natural balance (Walaga et al., 2005). Likewise, intensive agricultural activities made in order to obtain high yield with conventional agriculture led to over exploitation of soil, environmental pollution, destroying of natural balance and product quality and formation of remaining in the product (Bayram et al., 2007). In order to remove the hitches that took place and make the production and consumption of the products healthier, conscious producers and consumers came together and then suggested

and developed the Ecological Agriculture concept (Öztürk, 2004).

The European countries that considered such adverse outcomes suggested the "Organic Agriculture" concept and started the works to make agricultural production to be sensitive to environment and human health as well as be sustainable. In the year 1972, "International Federation of Organic Agriculture Movements" (IFOAM) which have its headquarters in Germany was founded. Organic agriculture was thought to be an alternative to traditional agriculture and named as "Ecological", "Organic" or "Biologic Agriculture", varying by countries (Çavdar, 2003).

Organic agriculture is a way of production which is done without using chemical inputs, using natural fertilizers and biological controls in plant and animal production in a way not to destroy natural balance as well as provided that in each stage products are under control and certificated for not damaging human health (Okcu et al., 2013). Among the general purposes of organic agriculture are; to protect biological and

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mineral structure of soil, not to damage natural flora and fauna, strengthen the ecological relationship destroyed between soil-human-plant-animal and to use regional sources in agricultural production as much as possible (Yavuzer and Bengisu, 2015). With organic agriculture, the health of farmers making the production and environmental health are also protected along with consumer health, and thanks to that; chemicals in the products arriving to table are blocked and this allows to grow up healthy generations (Ertem and Çiçekli, 2010). By developments in world trade of ecological agriculture started at 1970s, European origin companies demanded ecological product from Turkey and so during the years 1984-1985, organic agriculture practices started in our country. In those years, this took place in Aegean Region with dried fig and dried grape which are among the traditional export products of Turkey. After that, these products were followed by dried apricot and hazelnut and so other regions were involved (Atiker, 2004).

Eastern Black Sea Region is prominent with its topographical diversities and has a potential to grow various products with this characteristic at different microclimate zones. Factors such as inclined structure of the region, being short of land assets of agricultural establishments, reduction in youth population living at agriculture zone create difficulties in agricultural production. However, the will of the local people to work and their liking for agriculture constitute the biggest guarantee to overcome those barriers. Though it is easy to make organic agriculture in the region, it is very important that this issue is conducted not based on individuals but on areas within the region (Özcan and Yazıcıoğlu, 2015). Eastern Black Sea Region is rainy in every season and yearly temperature difference is low. Summer is cool, winters are mild.

The mountains block the humid whether of seaside to pass towards inland and thus there is an important climatic difference between seaside and inland of the region. Based on abundant and regular precipitation at the seaside, flow rate of the rivers are high. Therefore, irrigation is not needed so much and fallow agriculture is rarely observed (Anonymous, 2017a).

Organic Plant Production

As we review the areas where organic agriculture is made in Turkey by region, we observe that Eastern Anatolian Region ranks the first. This region is followed by Aegean Region, Southeastern Region, Central Anatolian Region, Mediterranean Region and Marmara Region (Yavaş and Akgül, 2015).

In Eastern Black Sea Region, 88719 tons of organic plant production were performed in 2016 with total of 10365 farmers on 9247 ha area. Besides, there are farmers (2725), areas (3528 ha) and product (9647 tons) at transition stage from conventional agriculture to organic agriculture. Transition process is the period from the beginning of an organic production in a certain area up to certification of products. Products in this process are named and considered as transition product, and they are not allowed for organic marketing. Transition period is three years for perennials and two years for annual plants (Anonymous, 2017b). With these, areas of organic production and the products obtained show an increase. When the numbers of farmers are reviewed, Rize comes first in the highest number of organic product producers with 7902 farmers which is followed by Trabzon with 962 farmers and Artvin with 952 farmers. The highest production is performed in the city of Rize (68514 tons) among 6 cities examined for organic production. Rize is followed by the cities of Ordu (8983 tons) and Gümüşhane (5907 tons). (Table 1)

Table 1. Amount of farmers, areas and production for Eastern Black Sea Region (Anonymous, 2017c).

City	Number of Farmers	Number of Farmers At Transition Process	Total Area (Ha)	Total Area At Transition Process (ha)	Amount of Production (tons)	Amount of Production At Transition Process (tons)
Artvin	952	325	1198	469	3138	1365
Rize	7902	1576	4319	1014	68514	3917
Trabzon	962	344	739	585	1882	985
Gümüşhane	25	15	457	169	5907	1093
Giresun	20	191	131	469	295	837
Ordu	504	274	2403	822	8983	1450
Total	10365	2725	9247	3528	88719	9647

There are three products (tea, hazelnut, blueberry) which are organically grown in Artvin city and it is the city in which a minimum of seven organic products are grown. Total number of organic production is 3138 tons. Organic hazelnut growing is made the most with 2189 tons of production amount, and when the amounts of production at transition process is added, it will reach 2900 tons (Table 2).

Table 2. Amounts of organic plant production for Artvin city (Anonymous, 2017c).

City	Product name	Amount of Production (tons)	Amount of Production At Transition Process (tons)	Total (tons)
Artvin	Tea	946.96	564.56	1511.52
	Hazelnut	2189.04	800.39	2989.43
	Blueberry	2.01	0.00	2.01
Total		3138.01	1364.95	4502.96

In Rize, 68514 tons of organic production is performed with 7902 farmers on 4319 ha area (Table 1). The most grown product in Rize city in organic production and in total plant production. Total amount of organically products is 68514 tons, and great majority of that is tea. Organic amount of tea production which the farmers usually obtain income is 67143 tons. The most grown products after tea are hazelnut and kiwi which have 790 tons and 550 tons of outputs respectively. Along with those products, there are slight amounts of organic production of apple, chestnut, mulberry and subtropical fruits, and the products which are also at transition period ensured Rize to be the city where the organic cultivation in Eastern Black Sea Region is made most (Table 3).

Table 3. Amounts of organic plant production for Rize city (Anonymous, 2017c).

City	Product name	Amount of Production (tons)	Amount of Production At Transition Process (tons)	Total (tons)
Rize	Pear	0.00	0.52	0.52
	Chestnut	3.99	1.41	5.40
	Tea	67142.97	3467.48	70610.45
	Timothy Grass	0.85	0.00	0.85
	Mulberry	1.40	0.36	1.76
	Apple	2.37	0.63	3.00
	Hazelnut	789.76	320.33	1110.10
	Fig	0.00	0.36	0.36
	Euonymus	0.86	0.32	1.18
	Cherry	0.20	0.00	0.20
	Kiwi	549.35	105.60	654.95
	Lemon	0.00	0.35	0.35
	Tangerine	3.67	2.05	5.72
	Blueberry	3.27	7.60	10.87
	Corn	5.99	7.37	13.37
	Orange	0.42	1.70	2.12
	Peach	0.12	0.00	0.12
	Trabzon's Date	3.17	0.32	3.49
	Table Grape	5.28	0.88	6.15
Total		68513.68	3917.30	72430.97

In Trabzon city, 1882 tons of organic production is performed with 962 farmers on 739 ha area (Table 1). Ten organic products is produced and this number will reach 11 after strawberry production completes its transition process. The most grown product is hazelnut (981.76 tons) which is followed by Timothy grass (148.07 tons) and tea (132.41 tons). In Trabzon, the amount of total organic production reaches 2867.18 tons together with transition process (Table 4).

Table 4. Amounts of organic plant production for Trabzon city (Anonymous, 2017c).

City	Product name	Amount of Production (tons)	Amount of Production At Transition Process (tons)	Total (tons)
Trabzon	Tea	830.60	132.41	963.02
	Timothy Grass	41.98	148.07	190.05
	Strawberry	0.00	78.84	78.84
	Beans	0.85	0.81	1.66
	Hazelnut	981.76	618.57	1600.33
	Euonymus	0.35	0.00	0.35
	Kiwi	17.12	0.00	17.12
	Blueberry	6.67	0.38	7.05
	Corn	0.86	6.37	7.24
	Trabzon's Date	0.60	0.00	0.60
Table Grape	0.92	0.00	0.92	
Total		1881.72	985.46	2867.18

Gümüşhane is the highest organic production produced city in produced Eastern Black Sea Region in terms of field crops. In Gümüşhane, totally 5907 tons of organic production performed with 25 farmers on 457 ha area (Table 1). The organic products grown in the city are corn, clover and barley with have 3836.42, 1657.65 and 120.31 tons of production amounts respectively (Table 5).

Table 5. Amounts of organic plant production for Gümüşhane city (Anonymous, 2017c).

City	Product name	Amount of Production (tons)	Amount of Production At Transition Process (tons)	Total (tons)
Gümüşhane	Barley	120.31	20.34	140.65
	Wheat	88.71	62.27	150.97
	Timothy Grass	56.76	0.99	57.75
	Beans	0.29	0.17	0.47
	Common Vetch	8.35	4.41	12.76
	Sainfoin	102.91	66.60	169.51
	Corn (Silage)	3836.42	598.75	4435.17
	Fallow	35.33	0.00	35.33
	Potato	0.00	0.07	0.07
	Clover	1657.65	339.61	1997.26
Total		5906.73	1093.22	6999.94

In Giresun, 295 tons of organic production is performed with 20 farmers on 131 ha area (Table 6). Giresun has the least farmer numbers and area, however; the amount of organic production will increase when farmers and areas at transition stage complete the process. Organic breeding is made in 3 different products which are hazelnut, nuts and blueberry, but the number of products will reach 5 with kiwi and corn which are at transition process. Hazelnut is the most grown product in organic production (196.84 tons) which is followed by chestnut (93 tons) and blueberry (5 tons).

Table 6. Amounts of organic plant production for Giresun city (Anonymous, 2017c).

City	Product name	Amount of Production (tons)	Amount of Production At Transition Process (tons)	Total (tons)
Giresun	Chestnut	93.00	0.00	93.00
	Hazelnut	196.84	835.11	1031.95
	Kiwi	0.00	0.54	0.54
	Blueberry	5.00	0.00	5.00
	Corn	0.00	1.00	1.00
Total		294.84	836.65	1131.50

In Ordu city, 8983 tons of organic production is performed with 504 farmers on 2403 ha area (Table 7). Ordu is the city which has the highest number of diversity in product growing. After the products will complete their transition process, 26 different products (such as barley, wheat, rye, kiwi) will be grown organically. Crab apple is one of the primary products which are grown organically (3000 tons). This is followed by hazelnut (2471.02 tons) and wild pear (2000 tons) (Table 7).

Table 7. Amounts of organic plant production for Ordu city (Anonymous, 2017c).

City	Product name	Amount of Production (tons)	Amount of Production At Transition Process (tons)	Total (tons)
Ordu	Raspberry	250.00	0.00	250.00
	Pear	0.15	0.00	0.15
	Barley	0.00	5.27	5.27
	Blackberry	200.00	0.00	200.00
	Wheat	0.00	68.80	68.80
	Chestnut	0.11	12.27	12.38
	Rye	0.00	3.16	3.16
	Timothy Grass	0.00	0.23	0.23
	Mulberry	0.12	0.00	0.12
	Apple	1.54	0.00	1.54
	Plum	0.21	0.00	0.21
	Beans	0.00	47.96	47.96
	Hazelnut	2471.02	989.59	3460.61
	Linden	7.00	0.00	7.00
	Fig	0.69	0.00	0.69
	Euonymus	0.15	0.00	0.15
	Kiwi	0.00	3.60	3.60
	Rosehip	50.00	0.00	50.00
	Corn	1.39	172.21	173.60
	Potato	0.00	143.33	143.33
	Table Grape	0.28	0.00	0.28
	Wild Pear	2000.00	0.00	2000.00
	Crab Apple	3000.00	0.00	3000.00
	Sloe	1000.00	0.00	1000.00
	Clover	0.00	2.40	2.40
	Oat	0.00	0.72	0.72
Total		8982.65	1449.54	10432.19

Organic Animal Production

Turkey has been introduced to organic agriculture during 1980s, and quite successful results were obtained in plant production. However, there was no adequate development in animal production as in plant production. There are very few company which can be shown as an example for organic animal production (Külekçi and Aksoy, 2015).

Organic animal production is defined as the animal production in which unnaturally produced products are not directly or indirectly used as input in animal production or used

at minimum level if they have to be, organic forages are preferred for animal nutrition and healthy animals are raised, each level is under control and certificated (Tekeli, 2017).

When organic stockbreeding data in Eastern Black Sea Region are reviewed, it is observed that organic cattle raising is done only in Gümüşhane city and egg poultry is only done in Ordu city. A total of 3300 tons production was made in Gümüşhane city from 776 heads of bovine and 211500 eggs were obtained in Ordu city from 10750 chickens (Table 8).

Table 8. Organic animal production data for Black Sea Region (Anonymous, 2017c).

Cities	Type of Animal	Total Farmers	Total Animals	Total Milk (tons)	Total Number of Eggs
Gümüşhane	Calf	0	81	0	0
	Cattle	0	140	0	0
	Cow (Milk)	3	555	3300	0
Total		3	776	3300	0
Ordu	Laying Hens	36	10750	0	211500

Organic beekeeping is made in Eastern Black Sea Region in the following cities ranked by honey production: Trabzon (58 tons; 3393 hives; 17 farmers), Artvin (38 tons; 1536 hives; 51 farmers) and Rize (8 tons; 2210 hives; 30 farmers)

Table 9. Organic beekeeping production data for Black Sea Region (Anonymous, 2017c).

Cities	Product	Total Farmers	Total Hives	Total Honey (tons)
Artvin	Honey	51	1526	38
Rize	Honey	30	2210	8
Trabzon	Honey	17	3393	58
Gümüşhane	Honey	13	1050	7
Ordu	Honey	2	239	2

Conclusion

The most important purpose of organic agriculture is to create high quality and healthy products for future generations and provide its sustainability based on environmental and food safety. In this regard, one of the regions having the highest potential of organic agriculture is the Eastern Black Sea Region. Eastern Black Sea Region is one of the most suitable regions due to its characteristics such as not having much developed industry, receiving too much rain and having natural habitat for many plants. That usage of artificial fertilizers and chemical drugs are scarcely any is an indication that the region will not face difficulties in transition to organic agriculture.

Consequently, strategies regarding organic agriculture should be developed for Eastern Black Sea Region which is suitable for organic agriculture, and organic agriculture should be enabled to become widespread in the region.

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