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COMPARING THE EUROPEAN COUNTRIES AND TURKEY FOR SOME ORGANIC PRODUCTS

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Abstract: Organic agriculture is a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects.

The regions with the largest areas of organic agricultural land are Oceania (22,8 million ha, which is almost 45% of the world's organic agricultural land) and Europe (12,7 million ha, 25%). Latin America has 6,7 million ha (13%) followed by Asia (4 million ha, 8%), North America (3 million ha, 6%) and Africa (1.7 million ha, 3%).

Organic agriculture in the world is developing rapidly. In 2015, organic agriculture is made in 179 countries on 51 million hectares. European and North American countries have the largest market share in 75.7 billion Euros organic product market.

In this study, comparative production advantages of selected organic products in European countries were calculated as an index on the basis of countries. The index used in the calculation is based on Balassa's index. Therefore organic and non-organic production quantities of selected products were used. These selected products were olives, grapes, apples, wheat, barley and potatoes. The data is obtained from the FAO and EUROSTAT databases covering the years 2012-2016.

According to the results, Slovenia has the largest share of organic olive production in European countries. The other countries that are leading in other organic production are: Belgium in organic grape production, Estonia in organic apple production, Italy in organic wheat and organic barley production, and Lithuania in organic potato production. The countries with the highest ratio of total organic crop area to total agricultural area are Liechtenstein, Austria and Sweden respectively.

Keywords: Balassa, European countries, agricultural production, organic farming.

INTRODUCTION

Today the transition of organic farming has gained great importance in the face of adverse effects of conventional agriculture and agricultural products.

Organic agriculture is a system that relies on ecosystem management rather than external agricultural inputs. Organic agriculture considers potential environmental and social impacts by eliminating the use of synthetic inputs, such as synthetic fertilizers and pesticides, genetically modified seeds and breeds, preservatives, veterinary drugs, additives, and irradiation. These are replaced with site-specific management practices that maintain and increase long-term soil fertility and prevent pest and diseases (Anonymous, 2018a)

In developed countries, demand to organic products has begun with consumers and environmental organizations which forced transition to organic farming and increase in organic product markets.

There are numerous studies about organic production have been carried out in Turkey (Gubbuk et al. (2004), Demiryürek et al. (2008), Demiryürek (2011)) and abroad (Weibel (2002), Dimova et al. (2015)).

In 2015 there were 179 organic producer countries in the world (Willer and Lernoud, 2017). Total organic product producers have reached 2,4 million in 2015. Over the last four years, organic production area has increased by 35,3% in the world. Organic product cultivation area was 37,6 million hectares in 2012 and 50,9 million hectares in 2015. Total organic production area was 1.1% of total agricultural land in 2015.

The aim of this study is to calculate organic production share for each European country in the organic production of European countries for some crops.

ORGANIC PRODUCTION IN WORLD AND EUROPEAN COUNTRIES

The countries with the largest organic product area in the world in 2015 are Australia (22,7 million ha), Argentina (3,07 million ha) and USA (2,03 million ha).

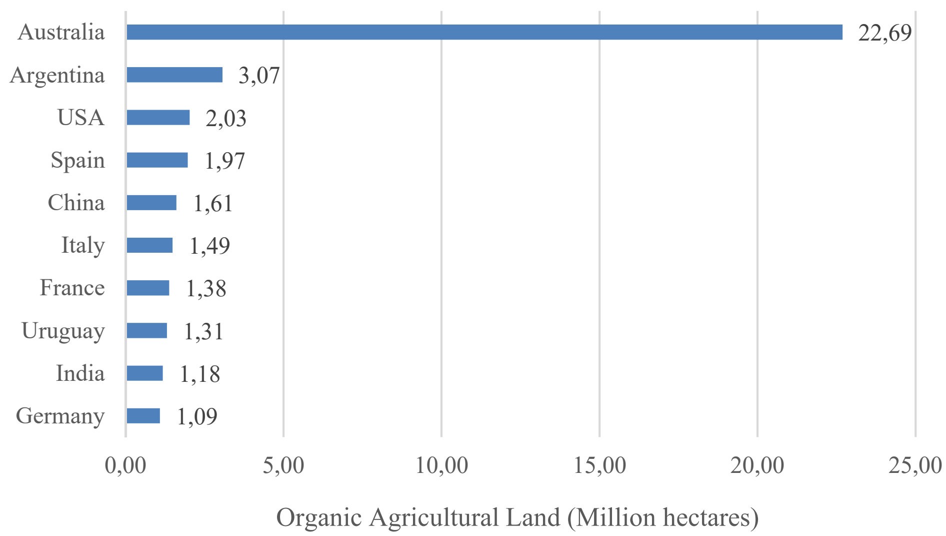

Figure 1. Countries with the largest organic production area (2015)

European countries' organic production area increased by 13,4% between 2012 and 2015 (Willer and Lernoud, 2017). Countries with the largest organic product production area among European countries in 2015 are: Spain (1.97 million ha), Italy (1,49 million ha) and

France (1,38 million ha). Liechtenstein (30,2%), Austria (21,3%) and Sweden (16,9%) have the highest percentage of organic production area in total agricultural land.

In this study, the organic production quantities of olive, grape, apple, wheat, barley of the European countries were examined.

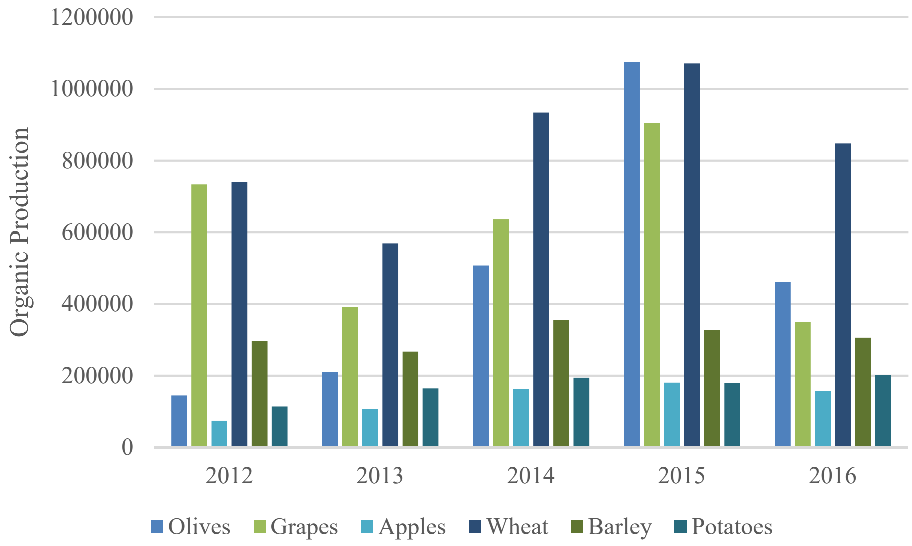

Figure 2. European Countries Organic Production in Selected Products Between 2012 – 2016

In 2012 total organic olive, grape, apple, wheat, barley and potato production were 145 thousand, 733 thousand, 74.4 thousand, 740 thousand, 296 thousand and 114 thousand tons respectively (Figure 2). After four years, in 2016 the production of the same products were 461,9 thousand, 349,1 thousand, 157,7 thousand, 848 thousand, 306,1 thousand and 201,7 thousand tons respectively.

MATERIAL AND METHOD

The data used in the study are obtained from Statistical Office of the European Union (EUROSTAT) and Food and Agriculture Organization of the United Nations (FAO) database between 2012 and 2016. The data obtained from the databases include the organic production quantity and production quantity of olives, grapes, apples, wheat, barley and potatoes.

Revealed Comparative Advantage (RCA) idea was first described by Liesner (1958). The index created to compare the competitive power of the United Kingdom's Common Market Countries was made functional by Balassa (1965). It is an index used in international economics for calculating the relative advantage or disadvantage of a certain country in a certain class of goods or services as evidenced by trade flows. In other words, the Balassa Index compares the country's domestic specialization (the share of the RCA index) for a product (or sector) with the specialization of the world (or the region) (Beningo, 2006).

Each country’s organic production ratio is compared with European total organic production ratio by using a formula based on Balassa’s Index.

The index includes production averages of the countries for last 5 years. Each organic product’s index (*I*) is calculated using the formula below:

$$I = \frac{\frac{OP_{ij}}{P_{ij}}}{\frac{OP_{iE}}{P_{iE}}}$$

Where *OP* is organic production, *P* is conventional production, *i, j* and *E* refer to product, country and European countries respectively.

The dividend part of the formula is the percentage of selected organic product in country's total production and divisor part of the formula is the percentage of the product in European countries' total production.

RESULTS

Olives

Among the countries producing organic olives between 2012 and 2016, the countries with the highest average organic production are: Italy (501.4 thousand tons), Spain (164,3 thousand tons) and Turkey (91 thousand tons) (Anonymous, 2018b). In total olive production Spain (6,04 million tons), Italy (2,55 million tons), Greece (2,23 million tons) and Turkey (1,74 million tons) are the first fourth countries (Anonymous, 2018c).

The country with the highest index ratio of organic olive production is Italy with 5,45 (Table 1). In other words, Italy is the country with the highest organic olive production among the European countries. Turkey is second with 1,45, Spain is third with 0,75, while Greece is ranked fourth with 0,65.

Table 1. Olives and Organic Olives Production Quantities and Production Indices

Country	Organic Production* (000 tonnes)	Country	Total Production** (000 tonnes)	Country	Index***
Italy	501,39	Spain	6 038,68	Italy	5,45
Spain	164,34	Italy	2 549,37	Turkey	1,45
Turkey	90,97	Greece	2 226,25	Spain	0,75
Greece	51,83	Turkey	1 738,80	Greece	0,65

*Source: *EUROSTAT ** FAO, ***Calculated according to formula*

Grapes

The countries with the highest average organic grape production value between 2012 and 2016 are: Italy (374,3 thousand tons), Spain (297,8 thousand tons) and Turkey (45,6 thousand tons) (Anonymous, 2018b). Considering grape production of the same countries Italy (7,6 million tonnes), Spain (6,15 million tons) and Turkey (4,01 million tonnes) are the first three countries produce most grape (Anonymous, 2018c).

The country with the highest index ratio of organic grape production is Italy with 2,53 (Table 2). Spain is second with 2,49 and Greece is third with 2,29. Turkey ranks sixth with 0,58.

Table 2. Grapes and Organic Grapes Production Quantities and Production Indices

Country	Organic Production* (000 tonnes)	Country	Total Production** (000 tonnes)	Country	Index***
Italy	374,26	Italy	7 595,22	Italy	2,53
Spain	297,77	Spain	6 153,62	Spain	2,49
Turkey	45,54	Turkey	4 014,21	Greece	2,29
Greece	34,56	Romania	811,46	Bulgaria	1,09
Bulgaria	5,03	Greece	774,27	Croatia	0,75

Country	Organic Production* (000 tonnes)	Country	Total Production** (000 tonnes)	Country	Index***
Romania	3,41	Hungary	421,76	Turkey	0,58
Hungary	2,87	Bulgaria	238,38	Slovenia	0,47
Croatia	2,29	Croatia	156,29	Hungary	0,35
Slovenia	0,92	Slovenia	99,82	Romania	0,22

*Source: *EUROSTAT ** FAO, ***Calculated according to formula*

Apples

The countries with the highest average organic apple production value between 2012 and 2016 are: Turkey (48,6 thousand tons), Italy (41,8 thousand tons) and Poland (15,4 thousand tons) (Anonymous, 2018b). Considering apple production of the same countries Poland (3,19 million tonnes), Turkey (2,8 million tons) and Italy (2,3 million tonnes) are the first three countries produce most apple (Anonymous, 2018c).

The country with the highest index ratio of organic apple production is United Kingdom with 5,17 (Table 3). Bulgaria is second with 3,57 and Netherlands is third with 3,18. Turkey ranks sixth with 2,47.

Table 3. Apples and Organic Apples Production Quantities and Production Indices

Country	Organic Production* (000 tonnes)	Country	Total Production** (000 tonnes)	Country	Index***
Turkey	48,62	Poland	3 186,16	UK	5,17
Italy	41,83	Turkey	2 798,69	Netherlands	3,18
Poland	15,38	Italy	2 322,22	Serbia	2,58
UK	14,52	Hungary	608,06	Italy	2,56
Spain	9,52	Spain	567,00	Turkey	2,47
Netherlands	7,17	Romania	486,61	Spain	2,38
Serbia	6,27	UK	298,83	Greece	1,55
Hungary	5,23	Serbia	344,55	Romania	1,34
Romania	4,60	Netherlands	320,20	Hungary	1,22
Slovakia	4,14	Greece	262,00	Poland	0,69

*Source: *EUROSTAT ** FAO, ***Calculated according to formula*

Wheat

Among the countries producing organic wheat between 2012 and 2016, the countries with the highest average organic production are: Italy (305 thousand tons), Turkey (229,6 thousand tons) and Romania (104,8 thousand tons) (Anonymous, 2018b). In total wheat production Turkey (20,9 million tonnes), United Kingdom (14,5 million tonnes), Poland (10,3 million tonnes) and Italy (7,5 million tons) are the first fourth countries (Anonymous, 2018c).

The country with the highest index ratio of organic wheat production is Italy with 12,53 (Table 4). In other words, Italy is the country with the highest organic wheat production among the European countries. Sweden is second with 10,82, Romania is third with 4,42, while Turkey is ranked fourth with 3,39.

Table 4. Wheat and Organic Wheat Production Quantities and Production Indices

Country	Organic Production* (000 tonnes)	Country	Total Production** (000 tonnes)	Country	Index***
Italy	305,25	Turkey	20 870,00	Italy	12,53
Turkey	229,58	UK	14 523,06	Sweden	10,82
Romania	104,78	Poland	10 301,43	Romania	4,42
Sweden	93,90	Italy	7 508,11	Turkey	3,39
UK	42,64	Romania	7 314,50	Lithuania	2,57
Spain	39,16	Spain	6 440,54	Hungary	2,17
Hungary	34,38	Bulgaria	5 196,29	Spain	1,87
Lithuania	28,84	Hungary	4 890,13	Czech Republic	1,59
Czech Rep.	25,28	Czech Rep.	4 878,18	UK	0,91
Greece	23,70	Lithuania	3 455,91	Poland	0,45

*Source: *EUROSTAT ** FAO, ***Calculated according to formula*

Barley

The countries with the highest average organic barley production value between 2012 and 2016 are: Italy (93,9 thousand tons), Spain (56,5 thousand tons) and United Kingdom (44,9 thousand tons) (Anonymous, 2018b). Considering barley production of the same countries France (11,4 million tonnes), Spain (7,5 million tons) and Turkey (7,2 million tonnes) are the first three countries produce most barley (Anonymous, 2018c).

The country with the highest index ratio of organic barley production is Italy with 31,16 (Table 5). Sweden is second with 7,98 and Romania is third with 3,36. Turkey ranks seventh with 1,64.

Table 5. Barley and Organic Barley Production Quantities and Production Indices

Country	Organic Production* (000 tonnes)	Country	Total Production** (000 tonnes)	Country	Index***
Italy	93,89	France	11 357,85	Italy	31,16
Spain	56,52	Spain	7 525,82	Sweden	7,98
UK	44,91	Turkey	7 200,00	Romania	3,36
Sweden	43,98	UK	6 710,00	Spain	2,29
France	42,37	Poland	3 358,07	UK	2,05
Turkey	38,62	Czech Rep.	1 802,79	Finland	1,81
Romania	16,88	Finland	1 697,94	Turkey	1,64
Greece	11,78	Sweden	1 683,74	Czech Rep.	1,17
Finland	10,06	Ireland	1 574,76	France	1,14
Czech Rep.	6,91	Romania	1 536,94	Poland	0,41

*Source: *EUROSTAT ** FAO, ***Calculated according to formula*

Potatoes

The countries with the highest average organic potatoes production value between 2012 and 2016 are: Netherlands (52 thousand tons), United Kingdom (32,6 thousand tons) and Sweden (19,8 thousand tons) (Anonymous, 2018b). Considering potatoes production of the same countries Poland (7,9 million tonnes), Netherlands (6,7 million tons) and United Kingdom (5,42 million tonnes) are the first three countries produce most potatoes (Anonymous, 2018c).

The country with the highest index ratio of organic potatoes production is Sweden with 17,32 (Table 6). Italy is second with 6,27 and Netherlands is third with 5,55. Turkey is on the tenth place with 0,25 ratio.

Table 6. Potatoes and Organic Potatoes Production Quantities and Production Indices

Country	Organic Production* (000 tonnes)	Country	Total Production** (000 tonnes)	Country	Index***
Netherlands	52,06	Poland	7 851,52	Sweden	17,33
UK	32,65	Netherlands	6 725,75	Italy	6,27
Sweden	19,78	UK	5 422,00	Netherlands	5,55
Latvia	17,75	Turkey	4 490,65	Greece	5,49
Poland	17,21	Belgium	3 566,23	UK	4,32
Belgium	12,76	Romania	2 932,72	Belgium	2,57
Italy	11,98	Spain	2 263,27	Poland	1,57
Finland	5,62	Italy	1 372,39	Spain	1,44
Greece	5,52	Sweden	819,72	Romania	0,57
Spain	4,55	Greece	721,23	Turkey	0,25

*Source: *EUROSTAT ** FAO, ***Calculated according to formula*

The European countries with the largest organic production areas and their shares are Liechtenstein (12,08), Austria (8,52), Sweden (6,76), Estonia (6,6) and Switzerland (5,24) (Willer and Lernoud, 2017).

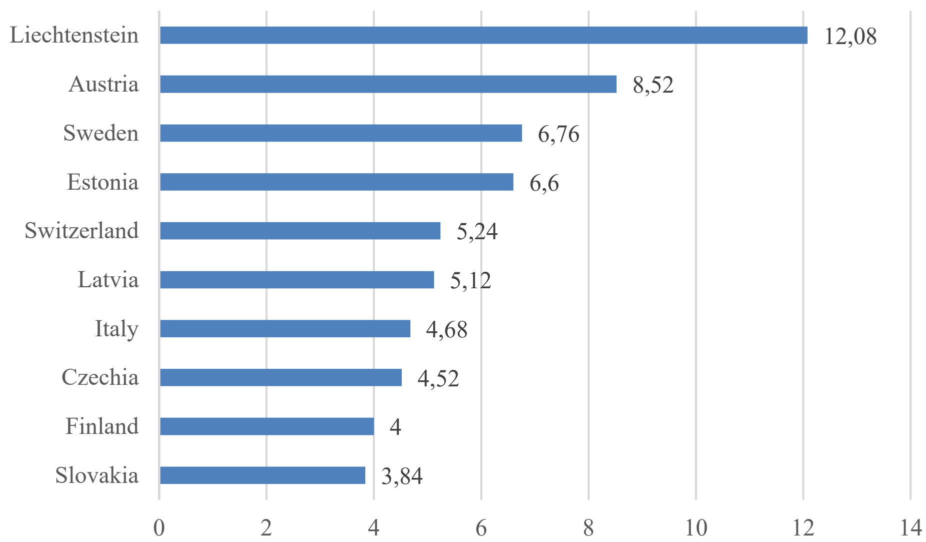

Figure 3. Top 10 European countries with the highest organic production areas (2015)

CONCLUSION

In this study, the organic production quantities of olive, grape, apple, wheat, barley and potato in European countries were examined. When compared to European countries' organic olive production share, the countries with the highest ratio between organic olive production and total olive production are Italy, Turkey and Spain.

Countries with the highest organic grape production ratio are Italy, Spain and Greece respectively. Turkey ranks sixth among European countries' organic grape production share.

Countries with the highest organic apple production ratio are the United Kingdom, Netherlands and Serbia while Turkey is on the fifth place.

Compared with European countries' organic wheat production ratio, the countries with the highest organic wheat production share are Italy, Sweden, Romania and Turkey.

In organic barley production, countries with the highest ratio are: Italy, Sweden and Romania. Sweden, Italy and Netherlands are the countries with the highest ratio of organic potato production. Turkey is ranking seventh and tenth in organic barley and potato production respectively.

Turkey ranks in top 3 countries among the Europe in olives, grapes, apples and wheat in both organic production and total production. Contrary, Turkey's ratio is far behind the European countries' organic production ratio.

Highest share of the production is organic in the countries that are not in a leading position in production. This causes these countries to have a high organic production ratio. Policies should be developed for leading countries in agricultural production to increase their organic production to help sustainability in agriculture and public health.

The benefits and necessity of organic farming should be explained to both producers and consumers to widespread organic agriculture. Also, governments should support these activities.

As the of organic agriculture expands, Turkey's organic production share is likely to be increased among the European countries. As a result, it is predicted that the incomes of producers and foreign trade opportunities will increase and consumers' access to healthy food will be easier.

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