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The Changes in Production and Foreign Trade of Primary and Processed Tomato: A Comparison of European Union and Turkey

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Abstract: Fresh and processed tomato is a growing industry in the European Union (EU) and changes in farming and processing industry of tomato are closely similar to crop farming pattern in Turkey as well as other developing countries. In 2004, EU-25 total tomatoes production represented about 17 million tones, and Turkey is one of the leader producer with 8 million tones. The tomato production variation in EU-25 is less than Turkey in last decades. Yield per ha of planted area in Turkey is lower than EU-25 due to insufficient farming practices and structure of farms. Structural problems such as integration models of producers and processors, input usage and high production cost affected negatively export possibilities and competition power of Turkey. EU's export and import are seriously affected by production variations and show fluctuations year to year. The variation coefficient showed that tomato export changes of the EU was more than tomato import changes of the EU. Although Turkey has some advantages to increase export volume to the EU, it is restricted by the EU due to applied improper quotas. In these circumstances, new market strategies should be developed by policymakers for tomato and tomato products exporters of Turkey.

Key words: Tomato, production, trade, Turkey and EU

INTRODUCTION

Heads of the European governments decided to start EU accession negotiations with Turkey in October 2005. However, a long period of accession negotiations is expected and the most policymakers and observers believe that it will not realize before 2014. After Turkey was consulted for full membership to the EU, there have been significant political, economic and social changes occurred in Turkey. Turkey's membership process has gained speed since 1990's. Food production systems have also changed over the past decades due to international and national food and environmental policies and consumer preferences particularly in exporter countries. In this context, the main challenges have been occurred in the adaptation to legal requirements of the EU and producers' acceptance of responsibility for food safety and quality.

In EU and Turkey, tomato is an important product for food safety like other fresh and processed vegetables and fruits. In addition, food consumption preference has been also changed. While food preference of some countries is similar in each other, some shows difference. USA, Russia, Italy and Turkey are the major producers of tomato in the world. Turkey produce 9% of the world

tomato supply however, production/export ratio is around 4% due to various reasons (Koç, 2005). The quality parameters of cultivated tomato varieties in Turkey are not acceptable in the world market and the most important part of the total production are sold as fresh or processed in domestic market.

Fresh and processed tomato is a growing industry and changes in farming and processing industry of tomato are closely similar to crop farming pattern in Turkey. The main problems of tomato farming reflect the specific characteristics of the Turkish agriculture such as insufficient modernization of production systems; insufficient investment in agriculture and in agri-industry; poor administrations of strict regulations on cultivation practices in crop and livestock production and inadequate education of food and agricultural products producers in Turkey. In spite of many structural problems of Turkish agriculture, there has been some important changes and improvements observed since 1990s.

Domestic consumption and markets of tomato have also developed in the last decades. But, Turkish tomato export to the EU has not improved in the same way because of the EU trade procedures. In this study, tomato production and consumption structure of the EU and

Turkey was analyzed and interactions between the EU and Turkey's tomatoes industry were evaluated in terms of production, export and import volume, consumption.

EUROSTAT and FAO data show that Italy, Spain, Greece and France are the four largest tomato producer countries in the EU. Tomato import trend is going upward in the EU and it is expected that some countries such as Germany and United Kingdom will expand their import volume. It is also expected that Italy and Greece will expand their production and consumption. Except for four largest producer countries, other EU members are the major importer countries of the world. Therefore, the EU is very attractive market for Turkey and for other non-member states.

In case of Turkey becomes a full member to the EU, it gains partial trade liberalization and it will increase its competitive pressure. The aim of this paper is to review the current production and trade structures for tomato and its product in EU and Turkey. Thus, the hypothesis of this study aims is to search the question whether production of tomato and its products will be depended on the factors such as per capita consumption of fresh tomato and export volume of primary and processed tomato in Turkey and EU. It therefore points out the potential impacts of Turkey-EU Custom Union and the full membership of Turkey to the EU on the production, processing and trade volume of fresh tomato and its product. For testing hypothesis of the study, Turkish and European tomato sector are examined by using the descriptive statistic (such as mean, standard deviation and variation coefficient). In the remainder of this paper, highlights are presented on production and consumption of tomato products by 1990-2004 data. This study will be interesting for researchers and will provide useful information for policymakers to assess the impacts of their policies in Turkey and in the EU.

TOMATO PRODUCTION AND CONSUMPTION TRENDS

The situation of tomato farming and processing industry indicates generally slight variations among countries. The total tomato production of the world is around 113.3 million tones and it shows an increasing trend by years. The major producers of the world are USA, Russia, Italy and Turkey. The share of Turkey in world tomato supply is around 9% as an average and the share of Turkey in total supply is slightly varied year to year.

Producer countries can be classified into two groups according to their production volume and its variation year to year. Italy, Spain, Greece, France, Portugal, the

Netherlands (Turkey is out of the group) are in the first group. It is known that this group members are the main producers. The second group is constituted from Belgium-Luxembourg, United Kingdom, Germany, Finland, Sweden, Denmark, Austria and Ireland. Tomato production in the second group is lower than the average of the EU. Tomato consumption of this group depends on exporter countries. Tomato production of EU varies depending on years. The production of EU has increased 8.95% in the past decades. While tomato production in Austria, Germany and Ireland have increased over 23%, this ratio was under 15% in other EU countries. Variation in tomato production was approximately 10-15% in the first group. The variation was estimated as 38.08% in Austria, 28.82% in Germany, 20.12% in Ireland and 16.49% in Turkey in the past 15 years (Table 1).

In 2004, EU-25 total tomato production was approximately 17 million tones. Italy is the leader producer with its 7 million tones production and Spain follows it with 4.4 million tones production. Turkey is one of the leader tomato producer country with its 8 million tones of production. Except for Belgium and Luxembourg, variation coefficient of tomato production is less than 54.1%. Average variation coefficient of tomato production is estimated as 8.97% in EU-25 and 16.49% in Turkey. The variation in tomato production of the EU-25 is less than Turkey in last 15 years.

About 70 to 75% of the total tomato production in Turkey is consumed fresh and the 25 to 30% of production is processed. Approximately 80% is used to produce tomato paste, 15% is utilized for canned tomatoes and the rest is used for ketchup, tomato juice and other products (Fidan, 2002; Sarisaçlı, 2005). Tomato for processing is generally produced in Aegean and Marmara regions of Turkey. Sixty industry plants were established for tomato processing and their annual processing capacity has reached to 600,000 tones per year of tomato paste, canned tomato, juice and other products (Sarisaçlı, 2005). In tomato paste production, Turkey comes the second order after Italy.

Seven firms account for about 70% of the total tomato paste production and the these firms can process 2,000 to 3,000 tones of tomatoes per day. The industry product yield is generally reported at about 6.0 kg of tomato yields 1.0 kg of paste (Sirtoglu, 2002). The industry product yield is generally reported at about the capacity use rates in tomato paste, sauce and canned industry are concentrated between 55 and 75% in Marmara and Aegean region of Turkey. The research results indicated that the profitability of these firms is higher than the average of Turkey's fruit and vegetables processing industry (Güneş and Bülbül, 2000).

Table 1: The changes in tomatoes production (Mt) (1990-2004)

Countries	2004	Mean	SD	CV
Austria	35,839	21,106.07	8,037	38.08
Belgium	250,000	78,925.33	111,852	141.72
Cyprus	38,200	35,420.00	3,180	8.98
Czech Republic	22,036	29,562.75	5,367	18.15
Denmark	22,000	19,466.67	1,815	9.32
Estonia	3,700	3,533.69	1,662	47.03
Finland	35,000	33,257.07	2,099	6.31
France	808,583	822,694.00	41,739	5.07
Germany	55,000	39,430.47	11,365	28.82
Greece	1,800,000	1,946,206.40	167,016	8.58
Hungary	231,600	281,075.40	92,041	32.75
Ireland	10,000	9,242.67	1,860	20.12
Italy	7,496,997	6,130,348.47	787,787	12.85
Latvia	12,000	6,553.15	2,419	36.91
Lithuania	4,000	6,953.85	2,329	33.49
Luxembourg	200	49.33	74	150.01
Malta	9,000	20,170.27	8,295	41.12
Netherlands	645,000	573,013.33	55,619	9.71
Poland	212,700	319,935.60	79,501	24.85
Portugal	1,100,000	1,001,279.13	123,036	12.29
Slovakia	61,469	67,866.50	11,730	17.28
Slovenia	5,431	8,801.62	4,759	54.07
Spain	4,366,500	3,418,885.60	522,754	15.29
Sweden	22,800	19,263.40	2,034	10.56
United Kingdom	80,000	115,897.73	18,478	15.94
EU-25	17,328,055	14,986,007.00	1,344,271	8.97
Turkey	8,000,000	7,642,066.67	1,259,998	16.49

Table 2: Change in tomatoes area harvested (Ha) (1990-2004)

Countries	2004	Mean	SD	CV
Austria	171	171.8	28	16.30
Belgium	600	260	377	145.00
Cyprus	470	472.67	68	14.39
Czech Republic	830	1,696.25	520	30.66
Denmark	100	88.27	19	21.52
Estonia	150	179.31	165	92.02
Finland	122	121.2	2	1.65
France	5,942	9,249.20	2,217	23.97
Germany	400	397.8	296	74.41
Greece	39,223	42,723.87	3,512	8.22
Hungary	5,452	11,787.73	4,762	40.40
Ireland	130	106	12	11.32
Italy	135,602	124,795.73	8,376	6.71
Latvia	800	785.46	226	28.77
Lithuania	500	984.62	293	29.76
Malta	280	523.2	126	24.08
Netherlands	1,300	1,300.00	151	11.62
Poland	12,100	22,604.40	6,787	30.03
Portugal	19,000	19,656.73	1,479	7.52
Slovakia	3,535	3,583.50	363	10.13
Slovenia	165	428.62	207	48.29
Spain	70,500	61,050.93	4,493	7.36
Sweden	65	61.2	5	8.17
United Kingdom	450	425.73	99	23.25
EU-25	297,887	302,081.20	15,464	5.12
Turkey	220,000	191,818.93	29,421	15.34

According to FAO data (2004), 220,000 hectares (ha) of land are planted and harvested with tomato in Turkey. Turkey takes the first place in terms of harvested area among the EU countries. Turkey are followed by Italy with 135,602 ha, Spain with 70,500 ha, Greece with 39,223 ha and Portugal with 19,000 ha. The variation in harvested area has been observed in Belgium at the highest level

and this variation was 145% in Belgium within the past 15 years. Belgium is followed by Estonia with 92.02%, Germany with 74.41% and Slovenia with 48.29% (Table 2).

Tomato production has expanded throughout Turkey and the majority of the total production is concentrated in the Marmara and Aegean regions of Turkey where the climatic and soil conditions are nearly ideal for farming. Industrial tomato is mainly cultivated in Balıkesir, Bursa and Çanakkale provinces of Marmara region, Manisa province of Aegean region and Tokat province of Central Anatolia region. Also, it was observed that there has been an increase in greenhouse tomato production in southern Turkey for fresh consumption during the winter season. In addition to this, there is an opportunity for expanding production of early varieties of industrial tomato in south and southeastern regions of Turkey (Sirtoglu, 2002). In greenhouse conditions, single or double farming is feasible and thus, double farming per year has increased the profitability of farming (Rad and Yarşi, 2005).

In respect of yield, Turkey takes the last place. The reason of increasing production quantity of Turkish tomato production is not increasing yield, the reason is increasing planted area. Belgium has an important role in increasing yield of tomato varieties in the EU. The highest yield is realized by the Netherlands as an average 496,154 kg ha⁻¹. The Netherlands is followed by Belgium with 416,667 kg ha⁻¹, Sweden with 350,769 kg ha⁻¹. While average yield of tomato is 36,364 kg ha⁻¹ in Turkey, the average yield of the EU (58,170 kg ha⁻¹) is 1.6 times more

Table 3: Changes in tomatoes yield (kg per ha) (1990-2004)

Countries	2004	Mean	SD	CV
Austria	2095,5	124,819.09	495,881	39.73
Belgium	41,6667	106,213.34	1,572,095	148.01
Cyprus	81,277	77,264.11	171,400	22.18
Czech Republic	26,549	19,080.31	59,788	31.33
Denmark	220,000	234,685.97	676,919	28.84
Estonia	24,667	31,075.62	147,297	47.4
Finland	286,885	274,305.52	151,759	5.53
France	136,079	94,802.80	251,155	26.49
Germany	137,500	116,839.39	382,538	32.74
Greece	45,891	45,660.95	33,433	7.32
Hungary	42,480	26,694.70	95,019	35.59
Ireland	76,923	87,805.13	189,821	21.62
Italy	55,287	49,025.34	41,928	8.55
Latvia	15,000	8,687.21	28,558	32.87
Lithuania	8,000	7,113.07	11,136	15.66
Malta	32,143	38,796.47	114,577	29.53
Netherlands	496,154	442,540.65	307,823	6.96
Poland	17,579	14,988.00	37,989	25.35
Portugal	57,895	51,370.71	83,721	16.30
Slovakia	17,389	19,014.76	35,162	18.49
Slovenia	32,915	21,632.39	68,723	31.77
Spain	61,936	55,913.65	68,208	12.20
Sweden	350,769	316,266.51	359,769	11.38
United Kingdom	177,778	286,492.19	759,173	26.50
Turkey	36,364	39,813.49	18,661	4.69

than the Turkish average yield. However, variation (CV) in the yield is less than the EU countries (Table 3) and thus, fluctuation in tomato yield is closely stable even though yield is less than the EU. It was seen that there is a great yield differences of table and industrial tomato varieties per planted area and the majority of growers are not generally satisfied the average yield of planted tomato varieties (Yücel and Ergun, 1991; Özçelik *et al.*, 1999; Tanrıvermio, 2000). On the other hand, there is an excess difference between field tomato farming and greenhouse cultivation in Turkey. The research results represented that the average yield of tomato in greenhouse is 2-4 times more than the field tomato farming (Rad and Yarşi, 2005).

Yield per ha of planted area in Turkey is lower than EU-25 due to the insufficient farming practices and structural problems of farms. Tomato farming is labor intensive and the bulk of production occurs on small farms. According to the research results carried out in farm level, sowing or planting seedlings, maintenance and harvesting is generally done by hand. The mechanization level is less than the EU-25 average due to the small parcel size and other reasons. Some inputs such as labour, farm chemicals and water are generally used more than the suggested amount by the agricultural extension services in market oriented fresh and processing tomatoes farming in field and greenhouse facilities (Tanrıvermio, 2000). The various problems caused the low yield in tomato farming. One of the reasons for such low yield is lack of the improved production techniques adopted by the growers particularly under the non-contract farms. Structural problems such as integration models of producers and

traders, the size of planted parcel, agricultural practices and input usage will be restricted yield increases and therefore production cost is affected negatively by these problems. As results of these structural problems, the competition power of exporter firms of fresh tomato and its products will be diminished due to more competitive prices of some other countries (such as China) and Turkey appears to be losing its export markets.

Growers produce more than 30 different varieties of table and processed tomato in Aegean and Marmara Region of Turkey (Yücel and Ergun, 1991). The most of the varieties are used for double purposes and the majority of these varieties characteristics is not convenient with the external demand of table and processed tomatoes. This situation is seriously restrict increasing foreign demand of Turkish tomato industry.

Seedlings of tomato are started around mid-March and transplanted after frost risk has passed (generally after mid-April). Harvest of early varieties begins in late July, with the peak harvest occurring around mid-August. Producers generally begin to pick the crop as soon as about half of a field is ripe (Sirtoglu, 2002). As all harvest is done by labour, three or four picking are possible in general and hand-picking may extend the harvest until the beginning of October in each year. The production practices directly affect the quality of fresh tomatoes and its products.

The fresh tomato supply can not be stored for a long duration and the characteristics of the product affects the evaluation of the supply as negatively. In fact, market prices of fresh tomatoes fluctuate from year to year and

Table 4: Per capita fresh tomato consumption (kg/Years)

Countries	2002
Austria	12.74
Belgium	25.95
Czech Republic	10.56
Denmark	18.53
Estonia	12.57
Finland	16.46
France	23.75
Germany	15.14
Greece	99.07
Hungary	24.32
Ireland	12.9
Italy	42.17
Latvia	9.5
Lithuania	7.35
Malta	32.57
Netherlands	15.67
Poland	7.62
Portugal	54.79
Slovakia	8.11
Slovenia	10.72
Spain	45.88
Sweden	18.92
United Kingdom	18.2
Turkey	80.39

within years depending on its supply and demand (Fidan, 2000). It was seen that the prices received by growers are unstable that cause production fluctuations year to year. The supply of fresh tomato increases in the period of July-October and the market (received by growers) prices decrease, after this period prices received by growers increase and the total demand of individual consumer and processors decreases. The fluctuations of market prices in harvesting season affects the profitability of farming and industrial firms and decrease grower's income per hectare of tomato planted area. In order to solve these negative impacts on farms and industrial plants, the integration model based on contracting and/or ownership should be developed in Turkey as well as other countries.

It was seen that there are different types of integration models between producers and processing and trade firms. Almost 80% of the processing tomato is grown under contract farming with the large processing firms (Özçelik *et al.*, 1999; Sirtoglu, 2002). The 20% of the production is grown without a contractual relations and these parts of the supply are processed by the small processor and producer cooperatives. This production is also oriented for the home processing and it is estimated that about 5,000 tones of tomato paste is produced for home consumption (Sirtoglu, 2002). Under production and marketing contracts, processors supply inputs for required quality and quantity and these contracts cover to buy all production that meets specified contract prices. The grower produces according to the terms of the contract and sells his products to the firm he has contracted with at the price and conditions specified in

the contract. However, since the contract prices is lower than the current market sale prices, producers have a tendency to sell their harvested tomato to non-contract processors or to the market. However, the contract between producers and firms have to be written again according to the legal arrangement titled "communiqué on the procedures and guidelines on growing agricultural products under contract" which was published and came into effect on 1 August 1998 (Bülbul und Tanrivermiş, 2002). In fact, these issues have not been solved by the legal regulation and these problems affected negatively the production and marketing strategies of processing and trade firms. The production, processing and marketing of tomato and its products are handled by the private firms and agricultural cooperatives. In fact, the role of cooperatives in tomato farming and processing field is less from the point of view production, processing, price formation and market power.

On the consumption side, fresh tomato consumption in the EU was expanded 25.2% in past 15 years. The change in total consumption is higher than variation of production. Although the change in domestic supply is 18.3%, it will be a deficit between domestic supply and the amount of consumption. This situation shows that EU consumption is closely linked with import or to external production. In Turkey, fresh tomato consumption has increased 30.3% which was similar to domestic supply. It seems that Turkey is independent on external production of tomatoes. Italy is the EU's largest tomato producer. In Italy, the change of consumption is lower than the change of tomato production.

Greece has the highest consumption growth rate in the EU that is followed by Turkey, Portugal and Spain. Per capita fresh tomato consumption in 2002 has been given in Table 4. While Turkey's per capita tomato consumption is less than Greece, it is higher than other countries. The range of per capita fresh tomato consumption in the EU is between 7.62 kg (Poland) and 99.07 kg (Greece) and approximately 13 times difference observed in consumption amount. The consumption in the Mediterranean countries is generally more than other EU countries. The average fresh tomato consumption in Turkey is 80.39 kg and it is consistent with the mediterranean countries average.

TOMATO EXPORT AND IMPORT IN EU AND TURKEY

The EU custom union agreement with Turkey was put into force in January 1, 1996, number 1/95. This agreement includes agricultural products. One of the agreement

condition was Turkey has to get integrated its own legislation with EU's agricultural and trade policies. This situation affects the competition power of Turkey with Italy, Spain, Greece and France for fresh tomato and its products (Akgüngör *et al.*, 2002).

Nearly 17 million tones of tomato was produced in EU and 12% of production is subject to export. It means that, 12 kg of tomato is exported from 100 kg produced tomato. Italy, Spain, Greece, France and the Netherlands are the main countries producing towards export. Export of these countries are more than 8% of their tomato production. The most important exporter countries in the EU are the Netherlands, Spain (18%), France (8%) and Italy (2%) respectively. In last decade EU tomato export has increased 16% and nearly half of tomato export has been realized by 4 EU member countries.

The Turkish tomato paste industry is totally dependent on foreign demand instead of the domestic consumption. In recent years, exports to traditional markets particularly Algeria and Libya have declined sharply as a result of political and economic problems in the importing countries. In 1994-1995 period, 50% of Turkey's tomato export was made to Saudi Arabia, since 1996 Russia has taken the first place in Turkish tomato export and Romania has followed it. In 1998, 53.8% of fresh tomato export was made to Russia. In last years Ukraine, Georgia and Croatia took place in export as new markets. Turkey showed 35.8% change in fresh tomato export. From this point, Turkey takes place in 6 orders. Turkey's tomato export to non-EU countries is more than the EU. To compensate for the losses of traditional markets, the Turkish industry has to create new markets particularly Japan and non-EU European countries. For instance, Japanese prefer the color and taste of Turkish paste and Japanese firms are in the partnership with Turkish processor.

Exporter firms of tomato and its products in some countries such as Italy, Greece and Spain, which are the competitors in the EU, protected through the subsidies and custom tariffs. In Turkey, the exporters of tomato paste are eligible for a tax rebate (tax reduction) and for tomato paste exports produced using tomato purchased under contract farming an additional 40% will be paid to farmers (of which 80% goes to the producers and 20% goes to the processor) will be paid. The impacts of these export promotion instruments is restricted compared with the EU custom tariffs.

The maximum change in fresh tomato export was observed in Luxembourg, Finland, Switzerland, Austria and Germany. When average fresh tomato export of 25 EU members is taken into consideration, it is seen that export change of EU is less than Turkey.

Italy is the leader tomato juice exporter country in the EU. Finland, Germany and Greece followed it. In the last decade tomato juice export change is observed the most in Luxembourg, Slovenia, Ireland and Portugal. According to 15 years average of tomato juice export data, Italy is the leader producer with 13,902 tones and Finland follows it with 3,775 tones, Germany 3,770 tones and Greece 3,211 tones (Table 5).

In tomato paste production, Turkey comes second after Italy in the EU. Italy takes 50% share from the EU tomato paste export. Greece, Portugal, Spain and Germany followed this with 18, 13, 8 and 1.3% shares, respectively. Italy, Greece and Spain are the main tomato paste export competitors of the EU. These countries got benefited from the EU membership as an advantage. Turkey must pay 16.8% tax for non-quota products. On the other hand, Italy goes to product differentiation and enlarge market share with new products. In Turkey, tomato paste is generally produce on June-August and export in following year. Tomato paste has the higher share in Turkish processed tomato products with 90%. Japan, Russia, Saudi Arabia, Malaysia and Germany are the main importer countries of Turkish tomato paste.

Variation in tomato paste production for last 15 years is the most in Malta and it is followed by Slovenia, Luxembourg and Cyprus. Turkey has the least tomato paste production variation among all EU countries.

Tomato products export quota that is given by EU for Turkey is 38,000 tones (30,000 tones tomato paste and 8,000 tones canned tomato). Quota is used as 15,000 tones between January 1-June 31 and 15,000 tones between July 1-December 31. The quota is inspected by the EU authorities. 15,000 tones of tomato products which enter during semi-year time is duty free and remaining parts of quota that enter into the EU markets are subject to a 15% tariff as common customs rates. However, the EU is not permitting Turkey to utilize its 38,000 tones duty-free quat for tomato paste exports because of dispute over duty-free EU meat exports to Turkey.

Despite of Turkey's important place and potential in production among other EU countries, Turkey export only a small amount of its production. One of the main reasons of this situation that the total production is not totally export oriented (Arikbay, 1996) and the main objectives of farming meets the needs of population. As most important condition for maintaining of export and competition, stability of tomato and its products quality and quantity is required for external markets under suitable conditions. On the other hand, trade agreements between Turkey and other countries affected the production and trade policies on each products. In field of tomato industry, the

Table 5: The change in tomatoes export (1990-2003) (Qty Mt)

Countries	Tomatoes			Tomato juice single-stem			Tomato paste		
	Mean	STD-DEV	CV	Mean	STD-DEV	CV	Mean	STD-DEV	CV
Austria	3,327.36	2,826	84.93	501.21	207	41.30	352.71	166	47.06
Belgium	52,306.64	82,920	158.53	511.57	817	159.70	762.79	1,207	158.23
Cyprus	123.07	74	60.13	704.00	566	80.40	27.21	45	165.38
Czech Republic	718.64	548	76.26	129.09	103	79.79	1,064.82	713	66.96
Denmark	2,645.00	973	36.79	1,347.00	1,632	121.16	163.14	112	68.65
Estonia	96.67	175	181.03			0.00	72.33	112	154.85
Finland	1,067.21	1,495	140.08	3,057.36	4,948	161.84	103.29	81	78.42
France	77,084.14	22,648	29.38	738.71	270	36.55	5,193.79	1,769	34.06
Germany	9,493.86	7,542	79.44	4,096.21	1,553	37.91	13,207.79	8,827	66.83
Greece	3,991.50	1,878	47.05	2,698.71	1,822	67.51	133,336.86	26,620	19.96
Hungary	1,229.93	616	50.08	12,503.93	13,249	105.96	20,011.21	10,442	52.18
Ireland	652.07	318	48.77	15.86	36	226.99	25.29	29	114.67
Italy	92,895.64	39,747	42.79	14,973.14	2,936	19.61	437,877.71	117,794	26.90
Latvia	104.58	188	179.77	1,469.42	1,414	96.23	49.17	84	170.84
Lithuania	1,782.75	1,373	77.02	1,563.33	2,426	155.18	465.75	407	87.39
Luxembourg	73.86	121	163.82	0.86	3	348.84	1.14	2	175.44
Malta	3.79	7	184.70	2.71	5	184.50	5.07	10	197.24
Netherlands	637,001.21	53,608	8.42	2,394.07	1,317	55.01	4,229.14	1,735	41.02
Poland	6,627.21	10,553	159.24	238.36	258	108.24	135.07	116	85.88
Portugal	2,735.00	800	29.25	435.57	895	205.48	109,670.93	20,093	18.32
Slovakia	8,176.00	2,217	27.12	23.91	30	125.47	2,811.45	1,569	55.81
Slovenia	60.25	37	61.41	0.67	2	298.51	170.58	322	188.77
Spain	737,101.21	217,190	29.47	1,576.50	968	61.40	71,823.93	35,211	49.02
Sweden	391.00	491	125.58	271.57	438	161.28	199.93	128	64.02
United Kingdom	5,901.57	2,833	48.00	440.21	230	52.25	1,616.07	1,702	105.32
EU-25	1,643,392.14	335,745	20.43	49,227.86	22,385	45.47	802,438.29	148,687	18.53
Turkey	124,700.93	58,786	47.14	319.71	293	91.65	139,920.71	22,246	15.90

Table 6: The change in tomato import (1990-2003) (Qty Mt)

Countries	Tomatoes			Tomato juice single-stem			Tomato paste		
	Mean	STD-DEV	CV	Mean	STD-DEV	CV	Mean	STD-DEV	CV
Austria	44,401.36	9,860	22.21	635.57	280	44.05	12,728.57	1,578	12.40
Belgium	17,539.71	27,881	158.96	564.86	928	164.29	9,790.50	15,503	158.35
Cyprus	85.57	143	167.11	8.29	11	132.69	426.86	376	88.09
Czech Republic	49,922.73	13,759	27.56	966.18	503	52.06	5,850.73	3,236	55.31
Denmark	17,924.71	5,111	28.51	423.14	247	58.37	8,118.21	874	10.77
Estonia	4,364.17	3,220	73.78			0.00	628.5	370	58.87
Finland	17,331.64	2,179	12.57	97.29	83	85.31	9,748.86	1,990	20.41
France	355,255.86	40,060	11.28	5,766.36	894	15.50	67,815.57	10,923	16.11
Germany	583,757.14	40,292	6.90	11,008.14	2,723	24.74	133,799.36	23,593	17.63
Greece	4,543.43	5,181	114.03	1,269.21	1,658	130.63	6,725.21	4,180	62.15
Hungary	4,810.00	2,443	50.79	94.5	154	162.96	6,283.86	4,881	77.68
Ireland	15,201.71	3,233	21.27	456.79	488	106.83	1,901.36	935	49.18
Italy	44,555.43	14,370	32.25	305.36	184	60.26	92,563.57	41,608	44.95
Latvia	6,918.92	5,606	81.02	675.33	470	69.60	209.67	307	146.42
Lithuania	4,516.17	3,063	67.82	2,526.67	1,706	67.52	1,908.08	1,162	60.90
Luxembourg	1,155.79	1,830	158.33	29.5	48	162.71	147.29	250	169.73
Malta	58.14	86	147.92	20.14	24	119.17	817.36	560	68.51
Netherlands	205,082.86	58,314	28.43	2,352.64	924	39.28	39,270.00	6,983	17.78
Poland	43,135.79	15,064	34.92	564.00	612	108.51	15,476.00	7,790	50.34
Portugal	15,912.79	13,465	84.62	107.14	72	67.20	1,498.00	1,033	68.96
Slovakia	8,015.82	3,484	43.46	587.45	738	125.63	1,712.55	993	57.98
Slovenia	12,673.75	8,681	68.50	74.83	141	188.43	1,894.58	309	16.31
Spain	16,828.50	17,681	105.07	1,478.21	1,629	110.20	9,721.50	5,617	57.78
Sweden	54,801.64	7,566	13.81	579.71	139	23.98	22,834.50	4,297	18.82
United Kingdom	280,906.14	28,592	10.18	3,655.64	1,211	33.13	111,612.86	23,395	20.96
EU-25	1,793,216.79	258,642	14.42	33,445.93	3,369	10.07	561,199.86	113,734	20.27
Turkey	324.07	651	200.88	3.00	3	100.00	1,469.00	2,059	140.16

half of the tomato export of Turkey is oriented to third countries and therefore, the lists of common customs rates determined by the EU are applied in Turkey's trade

relations with third countries. In this situation, Turkey's economic and trade relations with third countries totally depends on the EU regulations and decisions.

Tomato and tomato products import in EU is heavily realized by Germany, France, UK, the Netherlands and Switzerland. The Netherlands is the most important re-export country in the EU. Turkey takes nearly the last place in tomato and tomato products import. Cover rate of import to export in Turkey is higher than the EU countries. From this point, Italy, Spain, the Netherlands and Greece follows Turkey. According to data, while Turkey is exporting fresh tomato, it is importing tomato juice and processed tomato. Italy, the Netherlands, Germany, Spain and UK constituted 90% of Turkey's tomato juice and tomato products import (Table 6).

The EU export and import show an important fluctuation. It has been seen that, tomato export of EU is heavily affected by tomatoes production variation. This situation can be clearly seen from statistical results that are calculated based on 1990-2004 time series data. Variation coefficient of tomato import data is the lowest in Germany with 6.9% and the highest in the Netherlands with 58.31%. This coefficient pointed that, changes of tomato export in the EU was more than changes in tomato import in the EU. It means, export is more developed than import in the EU for tomato trade. According to FAO data, average tomato and tomato products import of the EU is nearly 2 million tones. Thirty five percent of the EU import is realized by Germany, France and UK.

CONCLUSIONS

The climate and soil characteristics of Turkey is closely suitable for tomato growing. Fresh and processed tomato industry has a growing trend in Turkey. Total fresh tomato production of world is approximately 113,3 million tones and Turkey takes a 7% share with its 8 million tones of production. The share of EU in world production is 15% with its 17 million tones of production. Although Turkey individually produce 47% of all EU-25 production amount, its trade volume is not well-developed as being in EU countries. There has been a growth in the production of tomato and its product and trade both in EU and Turkey in last decade. The growth of tomato production in Turkey is more than the EU. However, the productivity per planted area in Turkey is lower than the EU average. In Turkey, the most important factor restricting the productivity is inefficient use of inputs and structural problems of farms. The full membership of Turkey to EU will affect the production, processing and trade of fresh tomato and its product. This paper is tested the hypothesis of the question whether production of tomato and its products will be depended on the per capita consumption of fresh tomato and export volume of primary and processed tomato in Turkey and in EU.

Although Turkey produces nearly half of EU-25 tomato production quantity, 14 years time-series data showed that production, harvested area and export variation of Turkey is higher than EU-25 averages. Production quantity fluctuation of Turkey mostly depends on change in harvested area and the main reason of this situation is explained by the unstability of prices received by the growers. It was seen that there is strong relationship between fresh tomato supply and the market (prices received by grower). The unsuitability of prices received by growers cause production fluctuation that is explained in Cobweb theory well-known in the theory of economics. The price fluctuation in harvesting season affects the profitability of farms and industrial plants and decrease grower's income per hectare of tomato planted area. In order to solve the negative impacts of market prices on farms and industrial plants, the suitable integration model based on contracting and/or ownership should be developed strongly in Turkey as well as other countries. In spite of high variation coefficient of production, harvested area and export data of Turkey, it should be noted that per capita consumption of Turkey is very high and it is in the second order after Greece. Beside of inappropriate varieties cultivated by growers, export restrictions and small-scale and unorganized production units, it is clear that Turkey is not directed its production to export yet.

While Turkey exports 4% of its production, this ratio is 12% in EU as an average of 25 countries. The results of this study showed that the export potential of the EU countries are heavily affected by the production variations. Fresh tomato consumption variation of EU is higher than the variation of production. It means that most of EU countries have to import tomato from inter-EU countries or from third countries. There are several reasons of this situation. First of all, domestic consumption absorbs most of production in Turkey. Another important reason is dealing with cultivated varieties in Turkey. Individual growers produce more than 30 different varieties of tomato in Aegean and Marmara regions of Turkey. However, most of these varieties do not meet the requirements of external demand. The varieties of proceed tomato is selected by the technical staff of processing firms and therefore, the quality of tomato products will be increased and the external demand from Turkish tomato industry will be met in a great extend. Except for specific problems of tomato sector, in general structural problems of Turkish agriculture such as small-scale production units, problems in input usage and processor-producer relations etc. also affected the quality of products, capacity usage ratios, production cost, profitability of firms and export

potentials of primary and processed tomatoes. Beside of other reasons, quota implementation of the EU has restricted Turkish export potential and decreased its competitive power. While EU supports their member countries both in production and in export, Turkey is facing with trade quotas and has to pay taxes. In spite of EU countries are very attractive market for Turkey, it seems difficult for Turkey to meet their strict quality requirements and to compete with subsidized exporter countries of EU. In case of Turkey becomes full member of EU, it gains partial trade liberalization.

Although foreign demand of Turkish tomato and tomato products stay stable, the composition of importer countries has changed within last two decades. Turkey has great potential for both tomato production and export. However, Turkey has to take some measures in order to increase its export possibilities. First of all, the average yield of planted area should be increased and thus, the production cost should be decreased. The cultivated varieties of tomato in field and in greenhouses should be convenient with the external and domestic demand. The input usage and agricultural practices in tomato production control by the contractor firms under the integration model of contract farming and thus, required data and standards provided by processors for the food safety issues in external markets. In fact, it is necessary to develop an approach towards environmentally friendly tomato farming to increase the share of export amount of fresh tomato and its product in total production volume. By this way, cost (or price) and quality advantages will increase the export amount to the EU and third countries. Policy makers should focus on the developments in Italy, Spain and Greece in tomato farming and industry. In case right policies are adopted, Turkey may become a leader producer and exporter of the world. At present, it is seen that Turkey cannot compete with EU countries without production planning and appropriate export policies.

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