

## **Gross profit analysis in olive oil production: a case study of Hatay Region-Turkey**

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### **Abstract**

Turkey, due to its location in the Mediterranean basin, is one of the leading countries of the world in terms of both table olive / oil olive and olive oil production. Located in the East Mediterranean zone of the country's south, the Hatay province has succeeded in being one of the leading cities of Turkey with regards to the production and trade as a result of the consideration it has given on the establishment of new olive groves in recent years. According to the TSI data, Hatay province supplies 6.83% of oil olive production area and 8,98% of the olive oil production. The share of the total farmland in the province of olive fields is 19%. According to 2016 data, whereas in terms of olive oil support 72 million TL is paid to the manufacturers in Turkey, the nationwide share of the Hatay province is 11,23%. As of the same year, within the variation support in the province in 2016, the share of the support for olive oil has been 4,36%. Olives and olive oil trade have brought a distinct vitality in the economy of the province. According to 2014 data, 11,74% out of Turkey's total olive and olive oil export has been achieved in Hatay province. In this study, the economic analysis of olive oil production has been made in irriguous and dry conditions in Hatay province. In the study, according to the 2016 data, while gross profit in oil olive produced in irriguous conditions is 711,30 ETL/da, this value is estimated as 593,32 TL/da in dry conditions. In the study, it has been determined that the supports given for the oil olive production has a significant role on both increasing the gross profit and decreasing the product costs. Whereas the gross profit value showed an increase of 21,40% in enterprises producing oil olive in dry conditions in the province of Hatay when variance support and fuel-fertilizer support were added, this increase was able to reach a level of 22,35% in irriguous conditions. In the condition where the other supports (when organic production is favoured instead of good farming practices - rehabilitation of traditional olive gardens and biological - biotechnical combat supports), given by the MFAL, are added to these supports, it is could be seen that the the increase in gross profit values provided by the oil olive production in irriguous and dry conditions could reach the level 50%. In order to increase the level of income of the producers in the research area; it is needed that the use of modern cultivation techniques should be concentrated and manufacturers should continually be supported financially in this way, new varieties should be developed which will adopt easily to the province conditions that will indicate at a higher level of reaction to especially irrigation and fertilizer inputs and province specific kinds of olives should be protected.

**Keywords:** Agriculture. Oil Olive. Subsidy. Cost. Turkey.

## 1. Introduction

The homeland of olive which is a member of Oleacea (*Olea europaea* L.) family is Upper Mesopotamia which is covering the Southeastern Anatolia and South Front Asia. Being defined as the 20. century plant and which has not lost its significance over the centuries, olive is today thought to have originated from the area covering Mardin, Hatay, Syria, Palestine and the island of Cyprus (Anonymous, 2017a).

The olive tree has spread over the world's five continents, the northern and southern hemisphere and between the 30 – 45 degrees latitude especially with Mediterranean climate. The production of olive and olive oil is concentrated in the countries surrounding the Mediterranean basin in order of importance such as Spain, Italy, Greece, Tunisia, Turkey, Syria, Morocco and Portugal respectively. These eight countries located in the Mediterranean basin provide 90% of the world production of olive and olive oil alone (Öztürk et al., 2009).

The fact that there is recently an increasing interest on living long along with healthy and balanced diet worldwide resulted in people's olive and olive oil consumption. There are also scientific studies revealing the significance of olive and olive oil for health (Özata and Cömert, 2016). Along with the important antioxidant materials, (phenolic compounds, tocopherol and other aromatic materials) high level of singlet unsaturated fat (oleic) acid it contains, its higher oxidative stability, it is a natural fruit oil (or oily fruit juice) obtained by only physical methods (pressing, centrifugation and percolation). Due to these features, natural olive oil is very different from other cooking vegetable oils obtained by refining methods containing thermal and chemical processes (Visioli and Gali, 1998). Especially, because of its heart disease risk reduction, benign, cholesterol (HDL) rising and (LDL) bad-tempered reducing and protective effect against some of the cancer types, it has been regarded as a functional food by international medical science authorities (Harwood and Yaqoop, 2002).

According to 2014 data, world olive production is 15.516.980 tons, while the production of Turkey is 17.680.00 tons. Turkey is in the 4th rank in the world olive production with a share of 11,39%. According to TSI data, while our olive tree asset was 100 million in number in the early 2000s, with the effect of recent planting in the 2015/16 season it reached 172 million in number (Anonymous, 2017b).

According to Farmer Registration System (FRS) data in 2013, 85.796 families are cultivating olive in Turkey. In other words, if the ratio of being recorded to the FRS is considered, it could be said that approximately 2 million people live by with olive cultivation. In addition, it could be expressed that olive creates an occupation branch for about 8 - 10 million people when we consider the commercial activities in which it is processed as oil and table olive and its side products are utilized (Anonymous, 2016a).

In Turkey, İzmir, Mugla, Balıkesir, Bursa, Manisa, Çanakkale, Hatay, Gaziantep and Mersin are important olive producing provinces. Aegean, Marmara, Mediterranean, South-Eastern Anatolia Regions are also significant olive producing regions (Anonymous, 2017b). According to the TSI data, Hatay province supplies 6.83% of oil olive production area and 8,98% of the olive oil production (Anonymous, 2017c).

Agriculture sector in Hatay Province has special regard due to meeting the nutritional requirement, providing raw material for industry sector, comprising approximately 30% of employment and its contribution to export incomes in the city's economy. Sectors dominating the Hatay Province economic life are; commerce, agriculture, industry, transportation and construction industry. In Hatay Province, production and export of iron-steel goods, car filters, farming tools and equipments, along with raw vegetables and fruits and citrus fruits are carried out extensively (Anonymous, 2016b).

In this study, digital sizes concerning table olives and olive oil in the world and in Turkey are included. It is tried to explain the significance of olive cultivation in the Province of Hatay, determined as the study area, especially taking producers into consideration with the help of statistical data. In the study, the impact of oil olive production, its cost and supports on gross income in Hatay Province is analysed. Also within the scope of the study, 2017 unit prices concerning the supports directly effecting the producer income in oil olive production are included. In the final section of the study, recommendations relating the issues determined in the oil olive production in the Hatay province are provided.

## **2. Literature Review**

There are studies concerning the production of olives and olive oil from economic aspects in Turkey. In this section, some of the significant studies related with the issue have been mentioned. In a study by Karlı (2006), general structure of conventional and organic production of oil olive in Thrace and the Northern Aegean region, production economics,

marketing channels and the probable change and developmental process of the sector have been examined. As a result of the study, it has been predicted that the organic production is around 20% more profitable and with the help of organic productive fertilizers and using more environment friendly pesticides, transition to organic production will increase on a significant level.

In a study where 61 olive producers have been selected by sampling methods and have been divided into 5 groups according to the number of trees possessed by Özgürsoy (2006), it is seen that there are significant differences among the enterprises in terms of capital productivity and production costs and it is determined that the related differences resulted from the enterprise sizes, production techniques applied in the enterprises and market conditions of the business managers. In the study, it is also determined that olive cultivation is the most important source of income of producers in Hatay Province despite the incorrect applications made in the production processes such as spraying, irrigation, fertilization, maintenance, harvesting incorrect applications and periodical yield changing gradually from year to year. It is estimated that the average olive production area of enterprises object to the study is 78 da, the number of trees is 726, the amount of olive production is 32 tons, equity capital profitability is 32,9% and investment capital profitability is 34,1%.

Kuşçu and Tunçel (2009) have examined the general status of olive production in Samandag district of Hatay province, have put the issues arising in the production and have covered solution offers. Öztürk et al. (2009) included statistical data relating olive and olive oil production, olive types around the country and reviewed the Turkey's olive oil sector. In the study, in the light of the olive oil sector annual statistical values, production and consumption, the status of the import and export along with problems and solutions have been discussed with subheadings.

Tunaoğlu (2010) discusses the development of olive cultivation in Turkey with its historical and economic dimensions in his study. In a study by Artukoğlu et al. (2012) in Aydın, Çanakkale and İzmir, economic analysis of organic and conventional olive production has been conducted. It is aimed to make an assessment of organic and conventional olive cultivation by comparing them in terms of costs and yield in a study conducted depending on a questionnaire with farmers from both organic and conventional systems, each with 62 participants. According to the results of this study; it is estimated that variable costs of olive production is €4710,9/ha<sup>-1</sup> in organic and €2503,1/ha<sup>-1</sup> in conventional production. In terms of gross margin in the study, it is concluded that while conventional enterprises have had a profit

of €81,7 /ha<sup>-1</sup>, organic enterprises have had a loss of €263,8/ha<sup>-1</sup>. However, in the study, olive production cost is determined as €1,98/kg in organic production and as €1,97/kg in conventional production.

In their study, Çobanoğlu and Tunaoglu (2013) conducted an a comparative analysis of farms specialized in olive oil production in European Union (EU) and farms producing table and oil olives in Turkey by considering some of the economic indicatives. In the aforementioned analysis, the production costs, margins and income indicators have been emphasized. In a study by Acaravcı and Ergüven (2015), sectoral issues of vegetable oil industry have been referred, financial rates of vegetable oil sector have been interpreted and then financial charts of a representative firm in Hatay province where cotton plant is heavily cultivated have been analysed by rate analysis techniques.

Apart from the above mentioned studies, reports have been prepared in order to analyse olive cultivation sector by various institutions and organisations across Turkey (Anonymous 2015, 2016a and 2017a).

### 3. Materials and Methods

In the study, the data concerning oil olive country statistics have been obtained from Turkey Statistical Institute and the product cost data have been obtained from the Ministry of Food, Agriculture and Livestock Hatay Provincial Directorate. The statistical data relating oil olive cost in Hatay Province have been obtained from MFAL Hatay Provincial Directorate ARBER Hatay Provincial Directorate, Farmer Registration System (FRS). The study also includes reports and various study publications directed to olive and olive oil sector by World Food and Agriculture Organization (FAO), the National Olive Council (NOC), various institutions and organizations. It is particularly considered that the data in the study should belong to the recent periods since the issue is a current one.

Being among the long-life fruits, for olive there are 4 different periods. These are; a) planting period b) resting for yield, and yield increase period, c) Normal yield period, d) aging and yield decrease period (Rehber, 2012). In determining the oil production costs within the study, land renting, labour charges, current expenses, amortisation and interest were taken into account as the main cost elements(Çetin and Tipi, 2007).

In this study, the economic analysis has been conducted by using the single product budget analysis of oil olive production in Hatay province. The expenses have been given as

TL in the schedule of costs. The exchange rate equation is 1 \$ = \$3,5192 TL (Central Bank, 2017) as for the period of the study (December 2016). The cost is expressed as the sum of the monetary values belonging to the factors used in the production of one unit of goods and services (Erkuş et al., 1995). Physical quantities of inputs used in the production at product cost calculations are priced with prices that the enterprises paid. In conditions where the resources that belong to the enterprises are used, based on the alternative cost (opportunity cost) principle, goods and services which are used in production, even they belong to the enterprise, are priced with similar prices.

Production costs consist of fixed and variable costs. Variable costs are the costs which could generally be distributed for a specific product and of which the quantity might change depending on the product volume. In this study, valid prices, which are recent for the period when expenses are made, have been used for the calculation of current costs. In contrast, fixed costs are the costs which have been calculated for inputs providing service flow for more than one period and of which greatness is not dependent on product volume. The total costs to the production of the olive oil are calculated as variable and fixed costs and the following cost elements are taken into account as variable costs (Inan, 2016):

- Temporary labourer costs;
- Fertilizer costs;
- Pesticide costs;
- Irrigation costs;
- Maintenance costs;
- Harvesting costs;
- Marketing costs.

Fertilizer costs have been gained by pricing the fertilizer amount. Pesticide costs have been gained by summing up the pesticide expenditure calculated separately for pestilent combat, disease combat and weed combat which have all been implemented gradually through olive productions in the production of olives.

Irrigation costs for irrigated lands are calculated as the sum of values paid for water rate and manpower used in irrigation and the tools - machine. For maintenance costs, a calculation has been made considering the costs of tillage, pruning, dilution and weeding. When calculating the cost of oil olive costs, farmyard prices have been taken into consideration (Oğuz and Bayramoğlu, 2014). When calculating the fixed costs to olive cultivation, the following costs have been taken into account (Inan, 2016):

- Permanent labour;
- Depreciations;
- Interest;
- General administrative expenses.

Olive farming enterprises generally can not meet the needs of family labour force and labour force for the production and harvest. Additional labour force resulting in harvest is met with outside labour force and this foreign labour force is paid daily according to the quality of the work done.

About 2% of the present building capital of enterprises in amortisation accounts is reserved as building amortisation. As for the existing tools-machinery amortisation, 10% of the total tool-machine value has been calculated as amortisation (Özgürsoy, 2006).

In determining 2016 the oil olive annual cost in the study, land capital interest for olive cultivated in irriguous conditions has been defined as 500 TL/da, and 250 TL/da for olive cultivated in dry conditions. However, for both irrigated and dry conditions, fixed facility amortisation value per decare in oil olive production has been taken as 42,55 TL and fixed facility interest has been taken as 50 TL.

In interest calculation, active capital interest has been taken as 5%, loan interest rate for the agricultural sector has been taken half of the legal interest applied by T.R. Ziraat Bank (Kıral et al., 1999). As for general administrative expense, 3% of gross production value (GPV) has been included in calculations (Kıral et al., 1999).

However, in oil olive production, Gross Production Value (GPV), Gross Profit (GP), Net Profit (NP) criteria have been used (İnan, 2016). Gross Production Value is found by multiplying the quantity of olive oil produced and the prices gained by the producers. Gross Profit is gained by subtracting varying costs from the gross production value. Net Profit is gained by subtracting fixed costs from the gross production value. Gross profit is considered as an important measure of success in determining the competitive powers of production activities and is used in comparison of enterprises within the scope of Farming Accountancy Data Network (FADN) in EU (Keskin and Dellal 2011). This value means interest for the capital that the keeper, response to the labour force of keeper and the family members and the sum of a probable profit (Oğuz and Bayramoğlu, 2014). Another aspect which makes gross profit important is that it is the starting point in planning the enterprises (İnan, 2008).



## **4. Results and Discussion**

### **4.1. World olive and olive oil production and trade**

According to the report of the International Olive Council, world table olives production during the period of 2014-15 is 2.573.000 tons and in the period of the 2015-16, it is 2.650.000 tons. According to data from the period of 2015-16, Turkey is in the second place with 397.000 tons after EU countries. In the same year, EU countries took the first place with 271.500 tons out of 613.000 tons world table olive export and Turkey took the 4<sup>th</sup> place with 73.000 tons. In 2015-16 periods, while table olive world import was 622.000 tons, the USA took the first place with 145.000 tons.

According to the report of the International Olive Council, world table olives production during the period of 2014-15 is 2.458.000 tons and in the period of the 2015-16, it is 3.152.000 tons. According to data from the 2015-16 period, while Spain took the first place with 1.397.900 tons, Turkey had a level of olive oil production with 143.000 tons. In the same year, while Spain took the first place with 285.000 tons out of 771.000 tons world table olive export, Turkey took the 9<sup>th</sup> place with 20.000 tons. In 2015-16 period, while table olive world import was 802.000 tons, the USA took the first place with 304.000 tons.

Although there has not been any significant progress in the production of olive oil, the amount of annual consumption of olive oil per person in Turkey is 2 litres and this rate is around approximately 14 litres in other member countries of IOC. When per person consumption values are examined on the basis of countries, it is seen that it is 24 litres for Greece, 14 litres for Spain and Italy, 8 litres for Tunisia, Portugal, Lebanon and Syria (Anonymous, 2017a).

### **4.2. Agricultural Structure of Hatay Province**

According to 2011 census in Hatay, (422.950) 25.4% of the working population has been employed in agriculture, 50.3% in services and 24.3% in the sector of the industry. In Hatay economy, trade with Arab countries and mainly with Syria depending on the Cilvegözü and Yayladağı border gates constitutes a significant share. The trade is based mostly on industrial and agricultural goods. According to 2011 data, while iron and steel took the first place in the province export, fruit and vegetable took the second place (Anonymous, 2017d).



According to 2015 TSI data, agricultural production value of Hatay Province is 3.5 billion TL and the share of Turkey's general is (249 billion) 1.41%. In 2015, however, Hatay province took the 21<sup>st</sup> place in terms of the value of agricultural production throughout the country (Anonymous, 2017d). According to data from the year 2014, Hatay province took the 7<sup>th</sup> place in Turkey and 8<sup>th</sup> place in oil olive production in general (Anonymous, 2017e). Farming land distribution of Hatay Province is given in Table 1.

**Table 1: Distribution of Farming Land in the Province of Hatay Province (ha, %)**

Area Type	2015		2016	
	Area (ha)	Share (%)	Area (ha)	Share (%)
Arable Land	160.842	58,57	160.656	58,30
Olive Grove	51.600	18,79	51.841	18,81
Fruit Growing Area	27.996	10,20	29.255	10,62
Vegetable Field	28.994	10,56	28.664	10,40
Vineyard Area	5.160	1,88	5.162	1,87
<b>TOTAL</b>	<b>274,592</b>	<b>100,00</b>	<b>275.578</b>	<b>100,00</b>

Source: Anonymous, 2017. MFAL Hatay Provincial Directorate. 2016 Year Briefing File, p. 15 (access <http://hatay.tarim.gov.tr/Belgeler/Sol%20Men%C3%BC/BR%C4%B0F%C4%B0NG2016.pdf>; access date 28.11.2017)

While farming land takes the first place with a share of 58% in total agricultural land of Hatay Province, olive lands take the second place with an approximately share of 19% (51.841 ha). This clearly reveals the significance given to the olive production in the city (Table 1).

### 4.3. Oil Olive Production in Hatay Province

Hatay province has a quite important potential in the production of olives and olive oil in Turkey (Konuskan, 2017). With the effect of support policies and opening of areas used for different purposes to the olive farming and the increased number of trees draw attention on the prospective higher production potential of Turkey (Savran and Demirbaş, 2010). Because Hatay province is in a position that it is one of the cities with a significant rise parallel to the increase in the country's general olive tree number. Whereas Hatay province had 495,087 da olive planted area in 2012, this value reached 518.409 with an increase of 4,71% (Table 2).

**Table 2: Olive Planting Area, Production and Yield values in Hatay Province (2016)**

Product name	Hatay Province	Turkey	Hatay/Turkey (%)
Planting Area (da)			
Olives (Table)	95.661	2.262.516	4,23
Olives (Oil)	422.748	6.192.904	6,83
Production (tons)			
Olives (Table)	19.130	430.000	4,45
Olives (Oil)	116.770	1.300.000	8,98
<b>The average yield per tree (kg)</b>			
Olives (Table)	8,87	9,09	-
Olives (Oil)	12,61	12,99	-
<b>The number of trees at the fruit-bearing age</b>			
Olives (Table)	2.156.058	47.314.681	4,56
Olives (Oil)	9.259.744	100.088.449	9,25
<b>The number of trees at the non-fruit-bearing age</b>			
Olives (Table)	630.832	8.652.920	7,29
Olives (Oil)	2.948.330	17.702.038	16,66
<b>The total number of trees</b>			
Olives (Table)	2.786.890	55.967.601	4,98
Olives (Oil)	12.208.074	117.790.487	10,36

Source: Anonymous, 2017. TSI Plant Production Statistics. (access <https://biruni.tuik.gov.tr/bitkiselapp/bitkisel.zul>; access date 23.11.2017)

Hatay Province has a share of 4,23% in olive production areas and a share of % 6,83 in oil olives areas. The share of province from the country's olive production is 4,45% and in oil olives production, the share is 8,98% (Table 2).

There has not been a significant difference between olive yield values per tree in Turkey's general and Hatay Province. The ratio of number of olive trees at the period of acarpous to the country's general is about the level of 16,66% and this reveals the increase level in newly established olive facilities. This situation indicates that Hatay province, in time, will be one of the leading cities in oil olive production in Turkey.

According to 2016 TSI data, statistical values concerning the olive production areas and production amount in Hatay Province are shown in Table 3. The data shows that 135.900 tons of olive is produced in 518.409 hectares throughout the province in the year 2016.

**Table 3: Distribution of Olive Fields and Production Amount in Hatay Province According to Districts (2016)**

Districts	Area (da)	Share (%)	Production Quantity (tons)	Share (%)
Antakya	63.177	12,19	22.831	16,80
Altınözü	168.474	32,50	36.851	27,12
Arsuz	29.455	5,68	9.291	6,84
Belen	14.650	2,83	629	0,46
Defne	24.981	4,82	3.965	2,92
Dörtyol	16.350	3,15	3.037	2,23
Erzin	19.150	3,69	10.133	7,46
Hassa	35.409	6,83	9.486	6,98
Iskenderun	6.720	1,30	2.452	1,80
Kırıkhan	34.974	6,75	13.446	9,89
Kumlu	4.536	0,87	433	0,32
Payas	1.250	0,24	570	0,42
Reyhanlı	16.244	3,13	9.027	6,64
Samandağ	22.610	4,36	10.273	7,56
Yayladağı	60.429	11,66	3.476	2,56
<b>Total</b>	<b>518.409</b>	<b>100,00</b>	<b>135.900</b>	<b>100,00</b>

Source: Anonymous, 2017. TSI Plant Production Statistics. (access <https://biruni.tuik.gov.tr/bitkiselapp/bitkisel.zul>; access date 23.11.2017)

In all districts of Hatay province, olive production is carried out. However, the districts of Altınözü and Antakya consist of the 54% portion of olive fields and 43% of olive production amount.

#### 4.4. Supports and Activities Concerning Olive Production in Hatay Province

Being one of the 24 agricultural yields which was taken in the scope of Support Purchase for the first time in 1966, Olive oil was supported continuously until 1986 and was excluded from the support scope between 1987-1990. Taken in the scope of supports again in 1991, olive oil was again excluded from supports with the 5 April 1994 resolves.

Application gave place to Union purchase prices from time to time and support payments have been transformed into premium payments since 1998. With the help of premium payments, it has been aimed to comply with the World Trade Organization (WTO) and the EU Common Agricultural Policies, to increase tax revenues by taking the economy in records, to ensure that the agricultural records and inventory are held, to protect the producer

and business magnate and to encourage production and to provide raw materials to the industry with world prices.

With the aim of both meeting the demands of agricultural products, which have supply deficits and strategic importance for Turkey, from domestic resources and also providing a rational and healthy distribution of supports, a Model for Production and Supports for the Turkey's Agricultural Basins has been composed. While determining the amount of supports directly per kg under the name of "supports premium" in the scope of deficiency payments to the olive oil producers, even they vary periodically, domestic and foreign market prices, production costs and budget opportunities have been taken into consideration (Anonymous, 2017a).

The ongoing support activities by MFAL have been carried out within the scope of 17.09.2017 dated and 30183 numbered "Notification for Supporting Vegetative Production (Notification Number: 2017/39)". Unit prices of the year 2017 for the supports applied to olive and olive oil in Turkey are given in Table 4.

**Table 4: Unit Prices in Olive and Olive Oil Supports in Turkey (2017)**

Support Type	Product	(Krs(penny)/Kg)	Addition to the Contracted Production (Krs-penny-/Kg)
<b>Variant Payment Support</b>			
	Olive oil	80	-
<b>Field-Based Supports</b>		<b>(TL/da)</b>	
Good Agricultural Practices	Olive	50	
Organic Agriculture Promotions	Olive (2. Category Production)	70	
Diesel oil and Fertilizer Support	Olive	13	
Biological and Biotechnical Combat Support		<b>Biotechnical Comb. The Amount Of Support (TL/da)</b>	
	Olive	30	
<b>Other Agricultural Purpose Supports</b>		<b>Standard (TL/da)</b>	<b>Certified (TL/da)</b>
Domestic Support For Use of Certified Saplings/Seedling	Olive	100	280
The Rehabilitation of Traditional Olive Gardens	Olive	100	100
Domestic Support For Use of Certified Saplings/Seedling		<b>Grafted (TL/Piece)</b>	<b>Non-grafted (TL/Piece)</b>
Olive Sapling	Olive	1	1

Source: MFAL, 2017. Agricultural supports (access <http://www.tarim.gov.tr/Konular/Tarimsal-Destekler>, access date: 23.11.2017)

According to MFAL data, as a olive oil variance support, a total of 72 million TL has been paid in 2016 nationwide. The share of Hatay Province in country-wide is 11,23%. A total payment of \$186.205.355 is paid as agricultural supports in Hatay Province in 2016. The share of vegetative production supports in these supports is 84,69% (8.111.286 TL), the share of supports given for olive oil out of total supports is 4.36% and its share in vegetative production supports is 5,14%. In Hatay province, in the year of 2016, an average olive oil support of 2684,97 TL per enterprise was paid for 3021 enterprises. (Anonymous, 2017d)

As part of Altınözü Olives and Olive Oil Festival, taking place on 23.10.2017 in Hatay Province Centre, in Hatay Olive Workshop; 3 working teams were created as; a) Modern Olive Cultivation , b) Geographical Indication, branding organization and marketing, c) Stuffed olives, olive oil production technology and environmental effects (Anonymous, 2017f). Decisions made in the workshop are shared with public. However, in order to make visible changes to the olive and olive oil production in province wide, decisions made in the workshop must be reflected in practice.

#### **4.5. Olive and olive oil production in Hatay Province**

There are 72 Olive Oil pressing facilities active with Industrial Registry Certificate issued by Provincial Directorate of the Ministry of Science, Industry and Technology and in these facilities approximately 40.862 tons of olive oil is extracted.

In recent years, with the increase of plantation of table olives, production of pickled-olives has come into terms even with a small amount. In the province, because of both promoting olive tree planting and incentive given to olive oil, olive cultivation areas have had an increasing tendency in recent years. The existence and distribution of press shops in Hatay Province are given in Table 5. Examining the table, it is understood that 66.04% of olive processing facilities are in the districts of Altınözü, Hassa, Antakya and Yayladağı.

**Table 5: Presence of Press Shop in Hatay Province and Distribution According to Districts**

District Name	Number of Press Shop	Share (%)
Antakya	8	15,09
Altınözü	11	20,75
Arsuz	3	5,66
Belen	3	5,66
Defne	4	7,55
Dörtyol	1	1,89
Erzin	2	3,77
Hassa	10	18,87
Kırıkhan	1	1,89
Reyhanlı	3	5,66
Samandağ	1	1,89
Yayladağı	6	11,32
<b>Total</b>	<b>3</b>	<b>100,00</b>

Source: MFAL Hatay Provincial Directorate, 2017. Hatay Agriculture Identity with Figures 2016, p. 44 (access <http://hatay.tarim.gov.tr/Belgeler/Sol%20Men%C3%BC/TARIM%20K%C4%B0ML%C4%B0%C4%9E%C4%B0%202016.pdf> ; access date 29.11.2017)

With the help of grants provided by Ministry of Food, Agriculture and Livestock in recent years within the framework of rural development support, continuous system olive oil and press facilities consistent with new technology have been established. Olive oil produced in Hatay Province for both domestic and foreign market have features in demand with regards to its taste and aroma. The development of this sector has also contributed to the development of the soap industry (Anonymous, 2017g).

According to Turkish Exporters Assembly (TEA) data in the year 2014, country's olives and olive oil exports have amounted to as USA\$ 228,3 million. In the export of olives and olive oil, İzmir province took the first place with USA\$ 45,5 million. Besides being in the first rank among all cities in oil olive production, in the 5<sup>th</sup> rank in table olive production and also having first rank export port, İzmir has the first place in olive, olive and olive oil export in the country. The province of Istanbul, with USA\$ 35.22 million export, although it is not a major producer of olives and olive oil, has located itself in the second place in olive and olive oil export because of its location and export potential. Hatay province, on the other

hand, is in the 5<sup>th</sup> place with its USA\$ 26.8 million export of olive and olive oil after Bursa and Gaziantep province (Anonymous, 2015).

#### 4.6. Olive production cost in Hatay Province

Oil olive cost in dry and irriguous conditions in Hatay province is given in Table 6 and Table 7. It is estimated that the sum of varying costs in oil olive produced in dry conditions in Hatay province is 506,68 TL/da, the sum of fixed costs is 357,75 TL/da and the sum of production costs is 864,43 TL.

**Table 6: Hatay Province Oil Olive Production Costs in Dry Conditions (2016)**

Processes	Process Group	Group	Cost Element	Transaction Quantity	Quantity	Unit	Unit Price	Transaction Amount (TL/da)
Deep Plow	1. Plow	Mach.	Plough	1		da	28,00	28,00
		Mach.	Rake	1		da	14,00	14,00
	2. Plow	Mach.	Rake	1		da	14,00	14,00
Trimming	Labour force	Lab.	Pruning Labour		15,00	hours	4,00	60,00
		Lab.	Pruning Waste		3,00	hours	2,00	6,00
Fertilizing	Chemical Fertilizer	Mat.	Nitrogenous Fertilizer		6,00	kg	1,00	6,00
		Mat.	Compound Fertilizer		13,00	kg	1,10	14,30
	Labour force	Lab.	Fertilizing	2	3,00	hours	4,00	24,00
Agricultural Struggle	Machine Rental	Mach.	Spraying Machine	2		da	15,00	30,00
	Pesticide	Mat.	Insect and Pest	1	0,125	kg	120,00	15,00
		Mat.	Fungicidal	1	0,55	kg	25,00	13,75
Harvest	Labour force	Lab.	Harvest Labour	1	45,00	hours	5,50	247,50
Total (TL/da)								482,55
Revolving Fund Interest (TL/da)								24,13
Variable Costs Total (TL/da)								506,68
General Administrative Expenses (TL/da)								15,20



The Interest Rate of Land Capital (TL/da)		250,00
Fixed Facilities Depreciation (TL/da)		42,55
Fixed Facility Interest (TL/da)		50,00
<b>Fixed Costs Total (TL/da)</b>		<b>357,75</b>
<b>The Sum of Production Costs (TL/da)</b>		<b>864,43</b>
<b>Gross Production Value (TL/da)</b>		<b>1.100,00</b>
<b>Gross Profit (TL/da)</b>		<b>593,32</b>
<b>Net Profit (TL/da)</b>		<b>253,57</b>
Yield (kg/da)		<b>400,00</b>
<b>Product Cost (TL/kg)</b>		<b>2,16</b>
<b>Product Selling Price (TL/kg)</b>		<b>2,75</b>

Source: MFAL Hatay Provincial Directorate, 2017.

The share of varying costs out of production costs is 58,61% and the share of fixed costs is % 41,39. The highest share in the elements of varying costs belongs to the harvest labour with 48,85%. The GPV obtained in return of 400 kg/da yield is 1100,00 TL/da. It is estimated that the cost in oil olive produced in dry conditions in Hatay Province is 2,16 TL/kg.

**Table 7: Hatay Province Oil Olive Production Costs in Irrigated Conditions (2016)**

Process Description	Process Group	Group	Cost Element	Quantity	Unit	Unit Price	Transaction Amount (TL/da)
Interim Plow	1. Plow	Mach.	Cultivator + Rake		da	42,00	42,00
	2. Plow	Mach.	Plough		da	28,00	28,00
		Mach.	Rake		da	14,00	14,00
Pruning	Labour force	Lab.	Pruning Labour	20,00	hours	4,00	80,00
		Lab.	Pruning Waste	5,00	hours	2,00	10,00
Fertilizing	Chemical Fertilizer	Mat.	Nitrogenous Fertilizer	32,00	kg	1,00	32,00
		Mat.	Compound Fertilizer	20,00	kg	1,10	22,00
	Labour force	Lab.	Fertilizing	6,00	hours	4,00	48,00
Sulama	Water Fee	Mat.	Water Fee		da	80,00	80,00
	Labour force	Lab.	Irrigation Labour	8,00	hours	5,00	40,00
Agricultural Combat	Machine Rental	Mach.	Spraying Machine		da	20,00	40,00

	Pesticide	Mat.	Insect and Pest	0,25	kg	120,00	30,00
		Mat.	Fungicidal	100	kg	25,00	25,00
Other Maintenance	Maintenance Labour Force	Lab.	Slicing - Rooting	8,00	hours	5,00	40,00
Harvest	Labour force	Lab.	Harvest Labour	66,00	hours	5,50	363,00
Total (TL/da)							894,00
Revolving Fund Interest (TL/da)							44,70
<b>Variable Costs Total (TL/da)</b>							<b>938,70</b>
General Administrative Expenses (TL/da)							28,16
The Interest Rate of Land Capital (TL/da)							500,00
Fixed Facility Amortisation (TL/da)							42,55
Fixed Facility Interest (TL/da)							50,00
<b>Fixed Costs Total (TL/da)</b>							<b>620,71</b>
<b>The Sum of Production Costs (TL/da)</b>							<b>1.559,41</b>
<b>GOV (TL/da)</b>							<b>1650,00</b>
<b>Gross Profit (TL/da)</b>							<b>711,30</b>
<b>Net Profit (TL/da)</b>							<b>90,59</b>
Yield (kg/ha)							600,00
<b>Product Cost (TL/kg)</b>							<b>2,60</b>
<b>Product Selling Price (TL/kg)</b>							<b>2,75</b>

Source: MFAL Hatay Provincial Directorate, 2017.

It is calculated that the sum of costs in oil olive cultivated in dry conditions in the province is 938,70 TL/da, the sum of fixed costs is 620,71 TL/da and total production costs is 1.559,41 TL. The share of varying costs out of production costs is 60.20% and the share of fixed costs is 39,80%. The highest share in the elements of varying costs belongs to the harvest labour with 38,67%. The GOV obtained in return of 600 kg/da yield is 1650.00 TL/da. It is estimated that the cost in oil olive produced in irrigated conditions in Hatay Province is 2,60 TL/kg.

Gross margin is an important criterion indicating the success of a business organization and is also one of the important indicators used in the planning. In present the study, while gross profit in oil olive produced under watery conditions is 711,30 TL/da, this value is estimated as 593,32 TL/da for oil olive produced in dry conditions. However, it is found that net profit value in oil olive production in dry conditions is lower than the value of the production in irriguous conditions. The main reason for this is that yield value in return to irrigation and fertilization costs has not been obtained. Therefore, it is necessary to

concentrate on breeding and production of varieties which could give higher reactions to fertilizer and irrigation.

#### 4.7. The effect of agricultural support on gross profit in oil olive production

The support given to olive producers considering the unit prices has been referred to in the related section. In the present study, the effect of oil olive producing enterprises in Hatay Province in the year of 2016 on reducing the production costs obtained from the unit area and on increasing the producers' revenue (obtained from the gross profit value) has been examined.

**Table 8: The reflection of oil olive supports of 2016 yields in Hatay province on the practice (\*).**

Support Type	Unit Price	In Dry Conditions	In Irriguous Conditions
Olive oil support	0,80 kr-penny-/lt	Olive oil equivalent (**) 400 kg/5 = 80 lt 80 lt * 0, 80kr-penny= 64,00 TL	Olive oil equivalent (**) 600 kg/5 = 120 lt 120 lt * 0, 80kr-penny- = 96,00 TL
Diesel and Fertilizer Support	13,00 TL/da	13,00 TL	13,00 TL
Good Agricultural Practices	50,00 TL/da	50,00 TL/da	50,00 TL/da
<b>Total</b>		<b>127,00 TL/da</b>	<b>159,00 TL/da</b>

(\*)1-In organic olive production, 70,00 TL/da support is given.

2-In the rehabilitation of traditional olive yards, 100,00 TL/da support is given.

3-In biological and biotechnical Combat, 30,00 TL/da support is given.

(\*\*) Within the predicative studies conducted for Hatay Province by the National Council of Olives (NCO) considering the 2016 yield, it is expressed that 1 kg of olive oil will be obtained from 5 kg oil olives (Anonymous, 2017h).

The gross profit in olive cultivating enterprises in dry conditions in the province of Hatay has been determined as 593,32 TL/da. With the help support received as 127,00 TL/da, the gross profit value has reached the level of 720,32 TL/da with an increase of 21,40%. In irrigated conditions however, the gross profit value, which is 711,30 TL/da, could reach to the level of 870,30 TL/da with an increase of 22,35%. The supports of organic production, rehabilitation of conventional olive yards (valid for the year 2017 and after), biological and biotechnical combat (total 200,00 TL/da) have not been included to the reduction in product

costs or the increase in the product's gross profit. In case these conditions are fulfilled, it is possible that the oil olive producers will have an increase of 50% in gross profit value.

## 5. Conclusion and Recommendations

In Hatay province economy, olive oil has a significant place. Production of olive makes itself apparent in city's economy gradually in each year with the added-value created in the process of its cultivation and marketing. Recommendations for the issues encountered in the cultivation and marketing stages of olive production in the city are briefly given below.

The number of olive trees in the province needs to be determined by using appropriate technological methods instead of estimation based on experience and observation. In order to reduce the effect of the periodicity in the production of olives, special attention must be given to rehabilitation of olive varieties. Cultural activities (irrigation, agricultural spraying, fertilizing and maintenance, etc.) should be carried out in modern conditions and with proper financial supports in the province.

Not only determination of olive varieties and types but also certification and genetic mapping of olives should be carried out in the Hatay Province. Besides, anyone who wants to plant any types should not be allowed in the stage of new production facility in the province, instead there should be limitations on this issue.

It is necessary to conduct fertilizing on the recommended levels in the study area. Concerning the reduction of costs, machine harvesting should be encouraged. Agricultural waste water, resulting from olive black water in olive oil enterprises causes environmental pollution because of the organic debris it includes. At this stage, this should be prevented by the establishment of waste treatment facilities and control of related ministries and institutions.

Increasing olive and olive oil consumption in the province should be encouraged with various means. Adulteration should be prevented by continuous control of olive oils sold in the market. An image specific to Hatay Province (such as Altınözü olive oil) should be created both in domestic and foreign markets. To this end, a promotion group should be created in the province. In this respect, the fact that EXPO will be held in the province of Hatay in 2021 and the province was announced as "City of Gastronomy of Unesco Creative Cities Network" in 2017 could be seen as a good opportunity and must be utilized.

Supports given to the production of olive oil have great importance in terms of the increasing value of the gross profit of olive producers or in terms of reducing the cost of products. Olive oil export supports should be in a satisfactory level in terms of both olive producers and olive oil processing industry and its export in the province of Hatay as well as across country. Because unit support prices given in the export stage of olive and olive oil is quite lower than the developed countries (such Spain). In order to compete on a world scale, a model specific to Turkey should be created by examining support policies (at production and marketing stages) of leading countries in olive and olive oil production and export. In this context, the pilot scheme could be made in Hatay Province.

Decisions made in Olive Workshop which was organized in direction of increasing quality and quantity in olive and olive oil production in Hatay Province must definitely put into practice. With this aim, periodical workshops should continue and each year the practices should be evaluated in the workshops for the forthcoming years.

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