ARCENG
INTERNATIONAL JOURNAL OF ARCHITECTURE AND ENGINEERING
ISSN
2822-6895

Article Arrival Date | Article Type | Article Published Date
07.09.2022 | Research Article | 20.12.2022

HAZELNUT GROWING IN TURKEY, PROBLEMS AND SOLUTION SUGGESTIONS

Ali BİÇER

Agricultural Engineer, Diyarbakır, Turkey

ABSTRACT

Hazelnut ranks second after almond in terms of both production and consumption among the hard-shelled fruits in the world. Consumption of hazelnut as a snack is limited and it is one of the basic raw materials of the food industry, especially in sectors such as chocolate and confectionery. Hazelnut; It is nutrient rich in folic acid, vitamins E, K and C, minerals such as iron, zinc, copper, protein, fiber and fat. It is known that hazelnut covers the temperate climate zone of the Northern Hemisphere in the form of wild forms from Japan to China, Manchuria, Caucasus, Turkey, Europe and North America. The cultivated varieties of hazelnut are grown in Turkey, Italy, Spain, USA, Chile, China, Iran, France, Azerbaijan, Russia and Georgia. World hazelnut production has increased significantly in recent years. Turkey, which ranks first in world hazelnut production, is followed by Italy, Azerbaijan and the USA, respectively. In recent years, it has been observed that there has been an increase in the production of Azerbaijan and the USA. In this study, the problems, innovations and the importance of Turkey in the cultivation of hazelnut are mentioned.

Keywords: Hazelnut, efficiency, Turkey

1. INTRODUCTION

Historical Process of Area and Production Increase The coastal areas of the Eastern Black Sea Region were the main production area until the late 1800s and early 1900s. In the following periods, there were migrations from east to west, and aquaculture spread to the Central and Western Black Sea coasts with the plants that the immigrants took with them. Hazelnut production was 8.200 tons in 1900 and 25,684 tons in 1907. Since export was not possible during World War I, the product that could not be sold was stored and some of it was processed into oil. Production increased to 35,000 tons in 1930. Then, government supports such as the base price, purchase guarantee, incentives for the use of fertilizers and the low annual labor need made hazelnut more attractive than other agricultural products and had a significant impact on the area increase. (Doğanay, 2012; Kaynar, 2012). In addition, the high prices in the years when the yield was low, accelerated the increase in planting areas. However, the area increase in the east and west of the Black Sea was not equal, and the rate of increase in the 1954-1994 period was 57% in the east and 788% in the west (Bostan, 1997). Today, 424,622.7 hectares (60.1%) of the production area, which has reached 706,667 hectares, is in the Eastern Black Sea Region, 278,934.7 hectares (39.5%) are in the Western Black Sea Region and the rest is in other provinces. In parallel with the increase in area, the production amount increased to 70,000 tons in 1960, 225,000 tons in 1970, 440,000 tons in 1990, 470,000 tons in 2000 and 800,791 tons in 2008. However, yields typically vary greatly from year to year.

In the recent period (2000-2017), the average production was 558,579 tons, and it ranged from 420,000 tons to 800,791 tons. Accordingly, the yield per hectare varied between 539 kg and

1,208 kg between 2004 and 2008, with an average of 851.5 kg. On the other hand, the productivity of other countries is higher.

Productivity was 2,302 kg in the USA, 2,021 kg in China, 1,753 kg in Georgia, 1,607 kg in Italy, 1,078 kg in Spain and 1,067 kg in Azerbaijan in 2016 (FAO, 2016). The hazelnut industry is based on exports, but since the increase in the export amount for many years was limited, stocks and stocking costs increased, especially in the high-yield years, and the unmarketable product was processed into oil and reflected as a loss to the treasury. In order to control the stock amount and prevent damage, the state has limited new plantings and has started the application of dismantling support to the producers who have removed the hazelnut orchards and switched to other products. However, these incentives were not effective because they were not implemented properly (Kayalak and Özçelik, 2012).

Turkey is the first country that comes to mind when hazelnut is mentioned. The Black Sea coast is the natural habitat of cultivated hazelnut (Corylus avellana L.) and hazelnut cultivation has been practiced for thousands of years. According to the available records, hazelnut trade XIV. goes back to the century. Today, commercial production is carried out in the area limited to 16 provinces in the Black Sea Region. These provinces are determined by laws. Hazelnut is the main source of income for most of the producers. According to the records, there are many producers in the Black Sea region and several million people make their living directly or indirectly from the hazelnut sector (production, input, marketing, crushing, processing, oil industry, transportation, export, etc.).

Turkey is the world's largest hazelnut producer country and has been providing the majority of the world's production for many years. However, the share of average hazelnut production in world production has decreased recently. Among the reasons for this, besides the product losses frequently caused by adverse climatic conditions, production increases in countries such as the USA, Azerbaijan, Georgia, China, Iran and Chile have an important place. The area increase in these countries has gained significant momentum especially in recent years. Turkey's production in 2016 was 420,000 tons. Italy with 120,572 tons, USA with 34,473 tons, Azerbaijan with 33,941 tons, Georgia with 29,500 tons, China with 26,071 tons, Chile with 16,327 tons, Spain and other countries with 15,306 tons (FAO, 2016).

2. PROBLEMS ENCOUNTERED IN HAZELNUT PRODUCTION

Hazelnut varieties were first cultivated in the Eastern Black Sea Region in our country. There are problems arising from the geographical structure of this region. The lands of hazelnut orchards are very inclined and poor in organic matter. Apart from these problems, there are also problems arising from the struggle with hazelnut pests and hazelnut production policies.

In our country, as in many sectors, there is not enough data in the agricultural sector. The absence of precise data such as production areas, number of producers, yield and production policy in hazelnut, which has an important place in the field of agricultural export, makes it difficult to find solutions to existing problems. Projects cannot be produced to find permanent solutions to these problems. The problems continue to persist due to the increase in hazelnut production areas and the production based on single product especially in the base lands. The businesses in the region generally carry out their production based on a single product.

Since most of the existing hazelnut orchards are over 50 years old on average, they have completed their economic yield life. A hazelnut producer needs an average of 30 decares or more in order to survive. But the average land size is below this. The fact that the total land amount of the hazelnut production enterprises is low, fragmented and scattered is a

disadvantage in terms of the profit of the enterprise. It prevents the problem from finding a solution in the problems that occur in the organization of producers and enterprises. High price policy reduces the competitiveness of the hazelnut processing industry in the domestic and foreign markets. Companies in the hazelnut processing industry generally have small capacities. More than 10% of hazelnut producers reside outside the region. For this reason, they cannot take care of hazelnut orchards enough. The high average age of the producers also causes the producers not to take enough care of their gardens. The financial weakness of the hazelnut enterprises, the fact that the producers reside elsewhere, the existence of a small amount of hazelnuts are forced to sell the hazelnuts at effective and unfavorable prices in marketing.

Although we are the first in the world in hazelnut production, we do not have a competitive national hazelnut policy on hazelnut production, control and yield increasing methods. Barriers such as the emergence of bureaucratic obstacles in hazelnut export affect the market and producers negatively. Failures in incentive and premium payments of hazelnut producers make the producers victims. The high cost of loans taken by the producers makes it difficult for them.

Advertising and promotion policies of hazelnut produced in Turkey are insufficient. Fiskobirlik approaches the problems with the logic of cooperatives and in some cases makes wrong decisions, there are application errors that arise. Lack of advertising and marketing causes the products to be sold at a lower price than they should be. The lack of adequate coordination between public and private sector organizations in hazelnut-related transactions confronts the producers as an obstacle to the competitiveness of the market.

Another problem in hazelnut production is that mistakes made in price determination and cost calculations negatively affect the hazelnut market. The disagreement of the producers on price determination causes double prices. Excessive fluctuations in the price of hazelnut increase the tendency to substitute for hazelnut products. The amount of pesticides used in hazelnut production both creates a residue problem and its unconscious use brings extra costs. However, it causes environmental problems.

Producers generally harvest hazelnuts manually from the branch. This prolongs the collection and processing of products. In addition, this practice increases worker expenses and reduces the profit rate. Manufacturers are insufficient in the use of technological tools.

When the drying process is started after the hazelnut harvest, the rainy weather prevents the hazelnut from drying out. Aflatoxin is formed as a result of not performing a good drying process and due to poor storage conditions of the product.

3. SOLUTION PROPOSALS

Against the above-mentioned problems, first of all, farmers and hazelnut lands should be systematically recorded in a database. A hazelnut map of Turkey with hazelnut fields should be prepared by making use of geographic information systems. After these processes, new production areas should be determined. Renewed hazelnut orchards should be ensured and new planting areas should be realized in the most efficient way. By applying various incentives, it should be ensured that the producer, especially the base lands, opens again to varieties with 2-3 crops per year, and the application should be recorded and followed up. The targeted results are not realized because the currently implemented hazelnut fields removal project is not followed up sufficiently. State incentives and premiums should be given to producers early and their grievances should be eliminated.

There should be no state intervention in Fiskobirlik, the union should take place in this sector within the framework of its own functions and should be managed with a producer focus. The

ISSN
2822-6895

hazelnut exchange should be used actively. Here, industrialists, exporters-importers and traders should be brought together through producer cooperatives and trades should be carried out in the stock market. Established councils, boards and cooperatives should be effectively audited in accordance with quality management.

Storage operations should be carried out in accordance with the licensed warehousing system. It should be ensured that the warehouses comply with TSE and ISO standards. Research and development studies on increasing efficiency should be given importance. In this regard, it should be worked in coordination, especially in cooperation with universities. Qualified personnel with technical knowledge in the field of hazelnut should be trained. Operations should be carried out with the guidance of qualified personnel in the field.

Hazelnut is one of the important agricultural products of our country that can be sold to the world. Advertising and marketing of these products should be done professionally. Turkish hazelnuts should be marketed in international fairs with necessary promotional activities. The visibility of the product should be increased by using the technological infrastructure. Information and promotional activities should be carried out at regular intervals.

Necessary legal arrangements should be made to prevent the continuous division of lands by inheritance. Projects should be made to increase the amount and yield of products to be taken from the unit area. In addition to increasing the quality of hazelnuts, studies should be carried out to reduce costs. Universities, public and private institutions carrying out these studies should be supported. In order to reduce production costs, agriculture should be mechanized. Technological innovations should be used and machine harvesting should be applied.

Most of the hazelnut production in the world takes place in our country. In order to preserve and further develop this advantage, a world hazelnut center should be established in our country. While increasing the yield and quality of hazelnuts, it should also be ensured that the produced hazelnuts are processed and transformed into products. Hazelnut is a product that directly appeals to the taste of the consumer. And hazelnuts and foods containing hazelnuts are usually products with high prices. These products should be diversified and increased in a way that appeals to the taste of the consumer.

More productive and suitable land conditions should be selected for hazelnut planting. Lands that are poor in organic nutrients cause the quality and yield of hazelnuts to be low. Tree system, single branch and double branch system should be used in suitable lands. In new hazelnut orchards, planting should be done by placing at least two different varieties that are compatible with the main varieties and have the same flowering times.

The product pattern should be diversified in the Eastern Black Sea Region. A product pattern should be created with products that produce products with hazelnuts and products that will bring additional income. Hazelnut cultivation should be encouraged within the scope of organic agriculture and good agricultural practices. Ecological hazelnut production should be given due importance.

In order to prevent biological pollution and protect human health, awareness trainings should be given to farmers. After these trainings, application areas should also be checked. Hazelnut varieties should be collected and dried separately when they reach harvest maturity. New technologies should be used in the drying process. The hazelnut drying process should be dried on a concrete floor or by the net method. Drying should not be done on the soil floor.

The supply of hazelnuts should be regularized. Information such as production area, production amount, market price, stocks, consumption, purchase, sale, import, export should be kept up-to-date in a database. In the light of the information here, statistics should be evaluated and plans should be made.

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4. HAZELNUT IN TURKEY

The cultivation of cultivated varieties of hazelnut in Turkey was first started in the Eastern Black Sea Region. The climatic characteristics of the Black Sea Region create the most ideal environment for hazelnuts. Hazelnut is the only plant that blooms and fertilizes in winter. The sepals of the female flowers form the hazelnut goblet called “çotanak”. There are various types of hazelnuts. The cultivated hazelnuts in our country can be 5-6 meters tall and are hybrids of 'Corylus Avellana' and 'Corylus Maxima' species. The image of Turkey hazelnut is given in Figure 1.

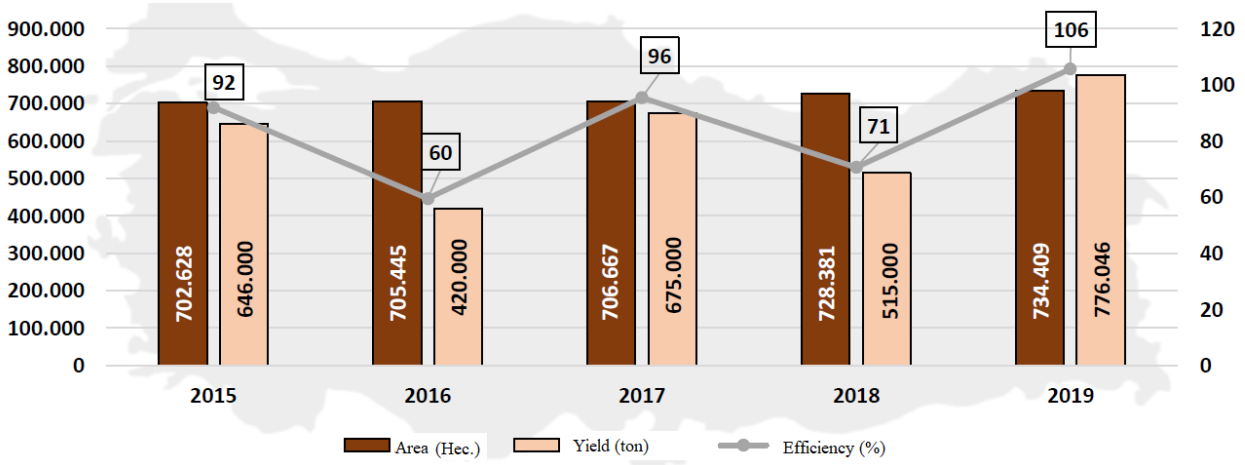
Figure 1. Hazelnut shape in Turkey

Hazelnut grown in Turkey is divided into two in terms of quality as Giresun and Levant. Giresun quality hazelnut is the most superior hazelnut in the world with its taste and oil content. Giresun hazelnut is grown in Giresun and Trabzon's Beşikdüzü, Vakfıkebir, Çarşıbaşı and Akçaabat districts. Although Levant quality hazelnuts grown in Trabzon and a part of Trabzon and Ordu, Samsun, Bolu, Sakarya, Zonguldak and Bartın provinces contain less oil than Giresun quality hazelnuts, they generally have a higher oil content than hazelnuts grown in other countries and are also taste-wise. is of superior quality. After the hazelnuts that mature in August are collected and dried, they are brought to the market in September and October and put up for sale.

According to TUIK data, hazelnut planting areas, which were 560 thousand hectares in 2002, reached 734 thousand hectares with an increase of 31% in 2019, and hazelnut production, which was 600 thousand tons in 2002, reached 776 thousand tons with an increase of 29% in 2019. The results of the relationship between area, production and yield between 2014-2019 are presented in Table 1 (TUIK).

ISSN
2822-6895

Table1. Yield-efficiency relationship by area



Hazelnut production areas in 16 provinces and 124 districts in our country have been determined as licensed areas by making changes with the Council of Ministers Decision No. 2001/3267 on the Planning of Hazelnut Production and Determination of Planting Areas No. 2488 and the Council of Ministers Decision No. 2014/7253. The provinces with licensed hazelnut production in 2019 are given in Figure 2.

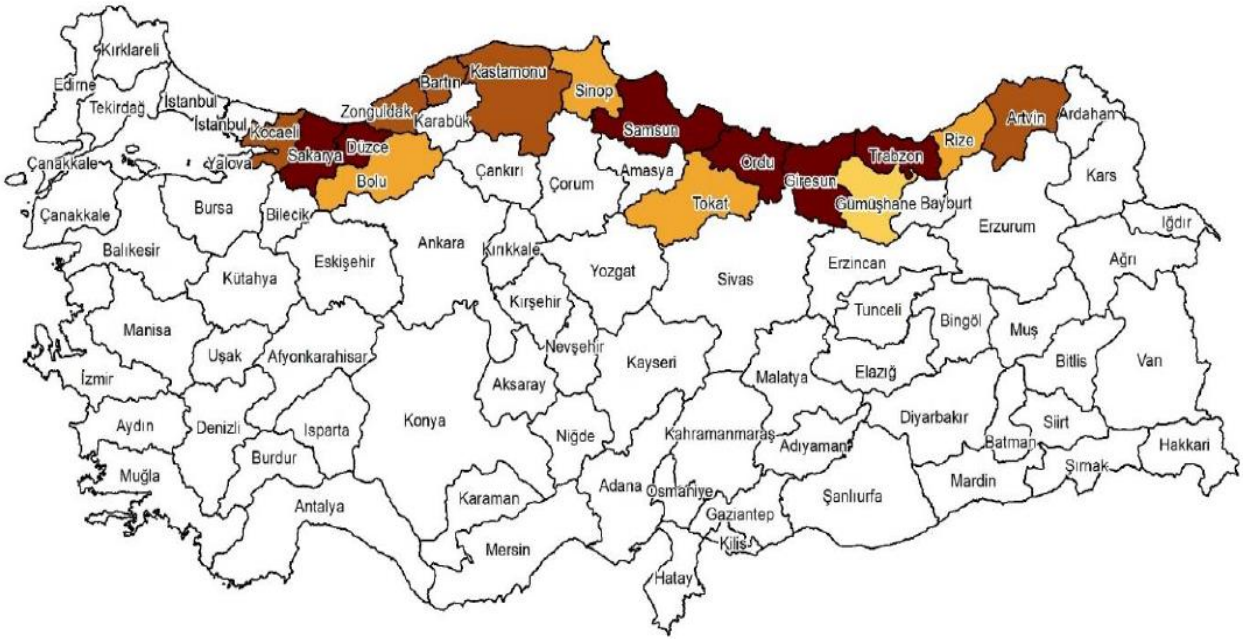


Figure 2. The provinces with licensed hazelnut production

In 2019, 31% of hazelnut planting areas are in Ordu, 16% in Samsun, 16% in Giresun, 10% in Sakarya, 9% in Düzce and 9% in Trabzon. According to 2019 data, 28% of hazelnut production is met from Ordu, 18% from Samsun, 13% from Sakarya, 11% from Düzce, 11% from Giresun and 7% from Trabzon. Year-based production is presented in Table 2.

Table 2. Hazelnut production data of some provinces

PROVINCES	2015		2016		2017		2018		2019	
Ordu	2.271.830	200.938	2.270.923	93.030	2.270.923	213.572	2.271.076	180.397	2.273.114	217.226
Samsun	906.229	90.857	936.087	67.855	936.182	96.240	1.145.240	66.363	1.164.384	137.841
Sakarya	725.981	82.708	727.976	77.279	730.838	88.840	734.424	78.300	743.486	102.123
Düzce	626.850	69.344	626.850	54.493	631.440	74.350	631.640	52.686	631.650	85.688
Giresun	1.171.112	105.023	1.170.872	37.591	1.171.020	93.339	1.171.903	46.395	1.177.780	84.766
Trabzon	653.498	39.126	655.525	28.978	655.524	41.594	655.074	34.271	655.353	53.946
Zonguldak	235.929	22.572	236.185	28.428	238.342	30.932	239.946	18.533	257.695	45.025
Kocaeli	80.617	7.530	79.813	7.033	79.808	11.898	79.801	12.509	81.797	13.395
Kastamonu	74.709	5.213	82.268	5.769	83.823	6.210	83.881	6.226	82.440	7.918
Diğer İller	279.524	22.689	267.952	19.544	268.770	18.025	270.823	19.320	276.388	28.118
Toplam	**7.026.279**	**646.000**	**7.054.451**	**420.000**	**7.066.670**	**675.000**	**7.283.808**	**515.000**	**7.344.087**	**776.046**

5. TURKEY EXPORTS

Turkey exported 319,772 tons of hazelnuts in 2019, generating a revenue of 2 billion dollars. Italy comes first among the countries that make up Turkey's hazelnut export revenue, with 84 thousand tons of hazelnut sales worth 548 million dollars. Italy is followed by Germany with 74 thousand tons of products and 435 million dollars, respectively, followed by France with 23 thousand tons of products and 147 million dollars of product value. 11 thousand tons of hazelnuts were exported to China, which is an alternative market, and an income of 87 million 179 thousand dollars was obtained. In the 2018-19 production season, 56% of our country's hazelnut exports are made as hazelnut kernels, 19% processed hazelnut kernels, 25% further processed hazelnut kernels and 0.15% in-shell hazelnuts. Italy 26%, Germany 23%, France 7%, Poland 4%, Netherlands 4%, China 3%, Austria 3%, Switzerland 3%, Canada 3%, Spain 2% and other countries 22% in Turkey's hazelnut exports in 2019. has a share. Turkey's hazelnut export amount by years is given in Table 3.

Table 3. Turkey's hazelnut export amount by years

COUNTRY	EXPORT AMOUNT (TON)					
	2015	2016	2017	2018	2019	2019 %
ITALY	51.485	51.535	54.434	51.171	83.899	26
GERMANY	61.008	50.314	63.543	70.686	73.477	23
FRANCE	24.366	22.468	22.859	18.500	22.719	7
POLAND	11.413	8.735	10.216	8.565	11.986	4
NETHERLANDS	6.566	7.659	10.128	11.158	11.206	4
CHINA	3.550	3.866	7.307	6.825	11.180	3
AUSTRIA	8.732	8.806	8.886	8.290	9.349	3
SWISS	8.525	9.190	10.089	9.877	9.181	3
CANADA	9.410	11.002	11.381	9.452	8.566	3
SPAIN	3.989	4.435	5.777	7.376	7.842	2
OTHERS	51.093	49.546	65.003	77.351	70.367	22
TOTAL	**240.137**	**227.556**	**269.623**	**279.251**	**319.772**	**100**

6. CONCLUSION

If no adverse events such as late spring frosts, drought, diseases and pests are experienced, the expected yield from the existing production areas has the potential to increase to one million tons. Although there is a strong demand for hazelnuts in the world markets, it should not be ignored that the hazelnut production of other countries is increasing. For this reason, the search for new markets and the development of brands opening up to the world will always be on the agenda. On the other hand, the effect of global warming is felt more and more every year around the world, and droughts or sudden-heavy rains are more frequent. In this context, irrigation of gardens, water conservation in the soil and terracing of sloping areas will come to the fore. After the harvest, it is predicted that hazelnut drying machines will become widespread rapidly and domestic machine production will increase.

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