

SECTIONS FROM LIFE AND AGRICULTURE

EDITOR
Assoc. Prof. Dr. Arzu IĐ



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PREFACE

Life and agriculture go hand in hand. They are pieces that complement each other. Because life cannot continue without agriculture, animal husbandry and crop production. Sometimes it is possible to replace the missing parts with other components, but if agriculture and livestock are missing or if the work places are insufficient, life will also be interrupted.

In this book, the sections where life and agriculture affect and integrate each other are mentioned. I would like to thank our authors for presenting their experiences and sharing their knowledge with the readers, with examples from all sections of life and agriculture.

Sincerely Yours,
ARZU IĞ

CHAPTER 3

THE SITUATION OF NUTS CULTIVATION IN TÜRKİYE

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INTRODUCTION

Türkiye, which has favorable and different climatic conditions, is located among the homeland or homelands of many fruit species (Davis, 1972). The fact that Türkiye is among the homelands of fruit species has its advantages. These advantages include being located at the crossroads of three regions, having the characteristics of the Mediterranean, Irano-Turanian, and Euro-Siberian areas of Anatolia, the intersection of the Mediterranean and Near Eastern gene centers on Anatolia, the fact that Anatolia has been home to many civilizations throughout history, and the fact that Anatolia is one of the world's known trade centers. Türkiye, which has 0.53% of the world's land area, is ahead of countries with a larger land area in terms of fruit production (Karadeniz, 2021). These advantages of Türkiye have led to an increase in the richness of species and varieties in the country. Of the 138 fruit species cultivated worldwide, more than 75 can be grown in Türkiye, 16 of which are subtropical fruit species (Ağaoğlu et al., 2019). According to FAO (2020) data, Türkiye has a production of approximately 24.153.128 tons in the world fruit production (excluding citrus fruits), which is 887.027.376 tons. With this production amount, Türkiye meets approximately 2.72% of the world's fruit production and is among the top 10 countries in fruit production. Türkiye also has a production share of 29.15% in Europe, with 82.853.809 tons of fruit production (FAO, 2022). Economic production is carried out in almost every region of Türkiye with fruit species and varieties adapted to different climatic and soil conditions. The country's agricultural area is

231.3 million decares, of which 35.6 million decares are used for fruit production. Nuts fruits have the highest share within this production area, with 37.9%. In terms of production amount, nuts fruits have a share of 6.4% (TÜİK, 2021).

1. DISTRIBUTION OF CROP GROUPS AND AGRICULTURAL AREAS IN TÜRKİYE

According to TÜİK (2022), Türkiye has a total agricultural area of 38.063 hectares. Within agricultural areas, grains and field crops have the highest share (42%), followed by meadows and pastures (38%), fruit, beverage, and spice crops (10%), and vegetables (2%) (Table 1) TÜİK (2022). Looking at the last 20 years in Türkiye, it is seen that while the total agricultural area was 41.196 hectares in 2002, this number fluctuated and decreased in the following years. Among the reasons for this may be the increase in the area allocated to fallow land and the occurrence of natural disasters and losses due to rapidly increasing urbanization in parallel with population growth. However, while the area allocated to fruit growing within the total agricultural area was 2.674 hectares in 2002, this amount increased by 34.44% to 3.595 hectares. In terms of vegetable areas, the vegetable production area, which was 930 hectares at the beginning, decreased by 18.82% to 755 hectares in 2021. When the agricultural areas of Türkiye, one of the world's horticultural crops producing countries, are evaluated in terms of fruit growing, it is seen that a significant portion of the agricultural areas are devoted to fruit growing. The area of fruits, beverages, and

spice plants constitutes approximately 9.445% of the total agricultural area.

Table 1: Total Agricultural Areas in Türkiye Between 2002 and 2021 and the Distribution of Plant Groups Within This Area

Year s	Total agricultura l area (ha)	Area of grains and other crops (ha)		Meadow and pasture land (ha)	Fruits, beverag e and spice crops area (ha)	Vegetabl e gardens area (ha)	Ornamenta l plants area (ha)
		Cultivate d area	Fallo w				
2002	41.196	17.935	5.040	14.617	2.674	930	-
2003	40.644	17.408	4.991	14.617	2.717	911	-
2004	41.210	17.962	4.956	14.617	2.780	895	-
2005	41.223	18.005	4.876	14.617	2.831	894	-
2006	40.493	17.440	4.691	14.617	2.895	850	-
2007	39.504	16.945	4.219	14.617	2.909	815	-
2008	39.122	16.460	4.259	14.617	2.950	836	-
2009	38.912	16.217	4.323	14.617	2.943	811	-
2010	39.011	16.333	4.249	14.617	3.011	802	-
2011	38.231	15.692	4.017	14.617	3.091	810	4
2012	38.399	15.463	4.286	14.617	3.201	827	5
2013	38.423	15.613	4.148	14.617	3.232	808	5
2014	38.558	15.782	4.108	14.617	3.243	804	5
2015	38.551	15.723	4.114	14.617	3.284	808	5
2016	38.328	15.575	3.998	14.617	3.329	804	5
2017	37.964	15.498	3.697	14.617	3.348	798	5
2018	37.797	15.421	3.513	14.617	3.457	784	5
2019	37.716	15.398	3.387	14.617	3.519	790	5
2020	37.762	15.628	3.173	14.617	3.559	779	5
2021	38.063	16.031	3.059	14.617	3.595	755	5

TÜİK, 2022

2. TOTAL AREA, NUMBER OF TREES, PRODUCTION QUANTITIES, AND YIELDS OF NUTS FRUIT

When fruit groups are analyzed in terms of species, the number of plants cultivated in Türkiye is relatively high. In addition to these species, there are wide varieties within each fruit. In terms of production amount and area for each fruit group, Türkiye is one of the leading countries in the world and is among the top 10 producing countries in the world for many species. When the regions of Türkiye are analyzed in terms of the amount of fruit production, the highest production is in the Mediterranean Region. It is followed by the Aegean, Central Anatolia, Marmara, Black Sea, Southeastern Anatolia, and Eastern Anatolia Regions (Gerçekçioğlu et al., 2012).

Important species of the nuts fruit group are Hazelnut, Pistachio, Almond, Walnut, and Chestnut. Data on the number of trees and production values of nuts fruit between 2004 and 2021 are shown in Table 2, while total area and yield values are shown in Table 3. In Türkiye, 178 thousand tons of almonds are produced in an area of 577.324 decares, and the number of fruit-bearing trees is approximately 12.5 million, while the number of non-fruit-bearing trees is approximately 6.8 million. Chestnut production is 77.792 tons, and the number of fruit-bearing trees is approximately 2.5 million, while the number of non-fruit-bearing trees is approximately 493 thousand. Hazelnuts are primarily produced as 'ocak,' and single-stem hazelnut cultivation has recently started. The number of fruiting hazelnut trees is approximately 395 million, and there are approximately 12 million non-

fruiting hazelnut trees. Türkiye's hazelnut production was 684 thousand tons on 7.389.201 decares in 2021. Pistachio production is about 119 thousand tons, and the number of fruiting trees is about 55.5 million, while the number of non-fruiting trees is about 24 million. Walnut, whose production in Türkiye increases every year like other nuts, has a production of 325 thousand tons. While the number of fruit-bearing trees in the country is approximately 14 million, the number of non-fruit-bearing trees is approximately 13 million. The yield of chestnuts is 31 kg/fruit-bearing tree, walnut 23 kg/fruit-bearing tree, almonds 14 kg/fruit-bearing tree, and pistachio 2 kg/fruit-bearing tree. In our country, hazelnut gardens are established with the ocak system, and hazelnut yield is 2 kg. Hazelnut has the highest production among nuts fruit and our country, which ranks first in the world hazelnut production, is far behind the world in terms of yield (Bak, 2021). The low yield in hazelnut orchards with the ocak system may be due to the old age of the orchards. Karadeniz & Kırca (2019) reported that fruit weight, kernel weight, yield and oil amount, which are important quality criteria in hazelnut, have the best values in 10-50 years old orchards, but yield and quality decrease significantly in 70 and 90 year old orchards.

There are many areas where nuts fruit are produced on a regional basis. Almonds are produced in all areas of the country except Erzurum-Kars region and the Black Sea coast with its cool summers. Almond production is concentrated in the southern and western parts of the country and around the Southeastern Taurus Mountains. Among these

areas, the Mediterranean coastal region and inland areas, the Aegean coast and the transition regions in the interior, the coastal part of the Marmara Region, the central parts of the South Eastern Taurus Mountains, and the eastern parts of the South Eastern Anatolia Region are the places where production is the most intensive (Durmuş & Yiğit, 2003; Aydoğdu & Şahin, 2020).

The areas where pistachio production is most common are around Şanlıurfa, Gaziantep, Kilis, and Siirt in the Southeastern Anatolia region. Şanlıurfa plateau, Harran and Suruç plains, and Gaziantep plateau are among the important production centers. It is also produced in Çanakkale, Mersin, Muğla, Manisa, Balıkesir, and Aydın provinces located in the coastal regions of the country (Durmuş & Yiğit, 2003; Çoban et al., 2022).

Walnut, which has a high adaptability to different climatic conditions, is mainly grown in cool and humid places in parts of the temperate climate zone with a continental climate. It is grown almost everywhere except the northeast of the Erzurum-Kars region and west of Salt Lake (Durmuş & Yiğit, 2003). The areas where it is intensively cultivated are the West-Central Black Sea region, South Marmara Region, Aegean Region, Büyük and Küçük Menderes valleys (Aksoy & Kaymak, 2021).

When it comes to hazelnut, the Black Sea Region comes to mind. Hazelnut production, which initially started in Giresun region, has

spread to the entire Black Sea Region with an increase in value and importance. Production is intensively carried out in Ordu, Trabzon, and Giresun regions. These regions meet most of the country's hazelnut production (Bars et al., 2018; Karadeniz, 2021).

Table 2: Data on The Number of Trees and Production Values of Nuts Fruit Between 2004-2021

Years	Number of Fruit-bearing Trees (number)				
	Almond	Chestnut	Hazelnut	Pistachio	Walnut
2004	3.450.000	1.890.000	325.000.000	26.500.000	4.200.000
2005	3.400.000	1.890.000	321.500.000	28.000.000	4.535.000
2006	3.235.839	1.862.864	337.380.483	28.264.261	4.595.453
2007	3.517.332	1.948.351	357.948.270	28.463.676	4.926.985
2008	3.430.219	1.949.491	340.285.551	28.667.681	5.094.781
2009	3.407.820	1.951.731	347.414.378	30.143.997	5.191.724
2010	3.683.032	1.920.235	356.761.858	29.617.102	5.441.051
2011	4.221.566	1.922.915	354.713.121	30.868.412	5.594.576
2012	4.679.833	1.939.101	348.781.578	37.150.045	5.977.397
2013	5.255.592	1.958.904	348.563.209	38.116.209	6.526.028
2014	5.637.326	1.991.270	349.189.710	39.329.512	7.000.897
2015	5.863.629	2.007.943	358.147.878	40.597.427	7.596.020
2016	6.663.996	1.949.991	360.416.783	42.570.004	8.171.185
2017	6.810.165	1.978.762	362.255.392	47.765.596	8.766.811
2018	8.490.351	1.954.372	378.280.019	49.557.873	9.875.068
2019	9.521.707	2.114.454	384.935.286	52.060.513	11.250.526
2020	10.380.249	2.306.992	386.194.685	54.548.247	12.488.338
2021	12.471.039	2.469.625	394.052.449	55.464.465	13.899.362
Years	Number of Trees of Non-Fruiting Age (number)				
	Almond	Chestnut	Hazelnut	Pistachio	Walnut
2004	500.000	475.000	20.000.000	16.000.000	2.200.000
2005	543.000	467.000	15.215.000	18.491.000	2.245.000
2006	578.729	447.308	15.135.382	18.462.394	2.353.440
2007	1.014.251	444.237	19.286.768	14.939.052	2.788.405
2008	1.279.101	529.159	16.803.193	14.032.781	2.951.522

2009	1.875.170	442.003	21.852.143	11.461.604	3.200.279
2010	2.589.493	393.760	11.510.803	10.562.487	3.643.380
2011	3.101.231	366.030	8.569.370	10.419.574	4.045.119
2012	3.242.945	306.821	8.210.481	12.428.352	4.541.958
2013	3.602.097	361.505	6.984.836	12.006.181	4.877.669
2014	3.814.999	362.136	6.220.407	11.152.593	5.374.456
2015	4.294.611	365.517	7.864.829	11.632.973	5.560.227
2016	4.964.011	370.664	7.370.865	17.192.812	6.873.271
2017	5.098.562	377.234	7.775.449	19.460.186	7.894.728
2018	5.400.809	405.518	9.818.708	20.529.250	8.896.575
2019	6.333.129	451.613	10.001.697	20.983.692	10.004.317
2020	7.093.395	483.827	10.110.291	22.721.902	11.579.246
2021	6.772.875	492.678	12.363.806	23.698.780	12.719.106
Production Amount (tons)					
Years	Almond	Chestnut	Hazelnut	Pistachio	Walnut
2004	37.000	49.000	350.000	30.000	126.000
2005	45.000	50.000	530.000	60.000	150.000
2006	43.285	53.814	661.000	110.000	129.614
2007	50.753	55.100	530.000	73.416	172.572
2008	52.774	55.395	800.791	120.113	170.897
2009	54.844	61.697	500.000	81.795	177.298
2010	55.398	59.171	600.000	128.000	178.142
2011	69.838	60.270	430.000	112.000	183.240
2012	80.261	57.881	660.000	150.000	203.212
2013	82.850	60.019	549.000	88.600	212.140
2014	73.230	63.762	450.000	80.000	180.807
2015	80.000	63.750	646.000	144.000	190.000
2016	85.000	64.750	420.000	170.000	195.000
2017	90.000	62.904	675.000	78.000	210.000
2018	100.000	63.580	515.000	240.000	215.000
2019	150.000	72.655	776.046	85.000	225.000
2020	159.187	76.045	665.000	296.376	286.706
2021	178.000	77.792	684.000	119.355	325.000

TÜİK, 2022

Chestnut, which grows spontaneously in forest areas in the Black Sea, Marmara, and Aegean coastal areas of Türkiye together with various forest trees, grows as a natural forest tree (Durmuş & Yiğit, 2003).

The regions where it grows intensively are as follows; in the areas between the Menteşe Mountains and Aydın, in the Büyük Menderes and Küçük Menderes plains, around Aydın and İzmir, in the region extending from the Küre Mountains to Sinop, in the Balıkesir plain and its surroundings and around Bursa (Tuttu et al., 2021).

Table 3: Data on total area and yield values of nuts fruit between 2004-2021

Years		Almond	Chestnut	Hazelnut	Pistachio	Walnut
2004	Total Area (decare)	78.000	88.500	6.500.000	2.200.000	168.000
	Yield (kg)	11	26	1	1	30
2005	Total Area (decare)	82.000	90.000	6.550.000	2.410.000	197.000
	Yield (kg)	13	26	2	2	33
2006	Total Area (decare)	83.100	85.135	6.662.262	2.414.670	208.967
	Yield (kg)	13	29	2	4	28
2007	Total Area (decare)	99.505	102.415	6.638.174	2.256.846	286.797
	Yield (kg)	14	28	1	3	35
2008	Total Area (decare)	109.130	103.915	6.631.928	2.253.713	328.873
	Yield (kg)	15	28	2	4	34
2009	Total Area (decare)	131.207	117.108	6.428.669	2.144.897	366.736
	Yield (kg)	16	32	1	3	34
2010	Total Area (decare)	171.478	118.533	6.678.649	2.212.229	413.932

	Yield (kg)	15	31	2	4	33
2011	Total Area (decare)	205.039	119.559	6.969.643	2.338.368	468.378
	Yield (kg)	17	31	1	4	33
2012	Total Area (decare)	235.547	121.244	7.014.067	2.835.517	552.019
	Yield (kg)	17	30	2	4	34
2013	Total Area (decare)	254.570	113.069	7.021.437	2.813.553	639.015
	Yield (kg)	16	31	2	2	33
2014	Total Area (decare)	270.203	111.164	7.011.413	2.823.338	693.947
	Yield (kg)	13	32	1	2	26
2015	Total Area (decare)	296.714	111.080	7.026.279	2.914.179	718.196
	Yield (kg)	14	32	2	4	25
2016	Total Area (decare)	333.221	115.704	7.054.451	3.134.316	868.528
	Yield (kg)	13	33	1	4	24
2017	Total Area (decare)	352.017	115.504	7.066.670	3.288.041	920.128
	Yield (kg)	13	32	2	2	24
2018	Total Area (decare)	421.914	118.249	7.283.808	3.545.003	1.117.749
	Yield (kg)	12	33	1	5	22
2019	Total Area (decare)	470.881	127.141	7.344.087	3.662.103	1.245.527
	Yield (kg)	16	34	2	2	20
2020	Total Area (decare)	523.695	135.705	7.345.377	3.818.466	1.417.899
	Yield (kg)	15	33	2	5	23
2021	Total Area (decare)	577.324	136.132	7.389.201	3.894.509	1.535.204
	Yield (kg)	14	31	2	2	23

TÜİK, 2022

3. NUTS FRUIT AND THEIR SUFFICIENCY LEVELS

The Turkish Statistical Institute (TÜİK) annually provides crop production data. Crop balance tables are also included in these data. Crop balance tables reveal the supply sources and utilization patterns of agricultural products in detail by comparing them over a particular reference period. The data on production, imports, exports, domestic utilization, per capita consumption, and sufficiency level in the fruit balance tables allow us to comment on the annual and future status of the relevant fruit while also providing information on the annual sufficiency of that fruit in the country.

Given the fruit balance tables, the degree of sufficiency shows the degree to which available production covers domestic use, expressed as a percentage, and is calculated as follows;

$$\text{Degree of sufficiency} = (\text{Available production} / \text{Domestic use}) \times 100$$

The degree of sufficiency indicates the extent to which a region's available production (domestic production) is able to meet its demand or domestic use (all the needs of people, animals, and industry). A value less than 100 represents a situation where production cannot fully meet domestic demand. Conversely, a value greater than 100 indicates the existence of exportable or stackable quantities that exceed domestic needs (TÜİK, 2022).

Table 4: Nuts Fruit Balance Table (2011-2021)

Product	Market Year	Production	Import	Export	Domestic Use	Per Capita Consumption	Sufficiency level
		(Ton)	(Ton)	(Ton)	(Ton)	(Kg)	(%)
Almond	2011	69.838	34.626	19.537	83.670	1.1	82
	2012	80.261	25.774	19.664	84.926	1.1	92.8
	2013	82.850	30.413	22.670	89.102	1.1	91.3
	2014	73.230	18.542	12.636	77.818	1.0	92.4
	2015	80.000	20.921	12.696	86.785	1.1	90.5
	2016	85.000	36.241	19.149	100.562	1.2	83
	2017	90.000	49.415	20.988	116.807	1.4	75.7
	2018	100.000	50.036	28.901	119.335	1.4	82.3
	2019	150.000	58.528	18.562	187.266	2.2	78.7
2020	159.187	77.313	42.826	190.809	2.2	81.9	
Hazelnut	2011	430.000	3.210	411.785	90.972	1.2	468.4
	2012	660.000	8.697	649.211	93.546	1.2	699.2
	2013	549.000	6.053	567.290	92.822	1.2	586.1
	2014	450.000	7.187	492.871	85.266	1.1	523
	2015	646.000	9.710	534.274	108.912	1.3	587.8
	2016	420.000	10.861	519.332	100.749	1.2	413.1
	2017	675.000	14.848	628.545	133.328	1.6	501.7
	2018	515.000	14.842	594.796	114.569	1.4	445.5
	2019	776.046	9.510	730.572	138.383	1.6	563.9
2020	665.000	16.337	624.412	119.188	1.4	552.9	
Walnut	2011	183.240	46.338	13.711	211.469	2.8	84.6
	2012	203.212	40.009	11.998	226.346	2.9	87.6
	2013	212.140	30.479	14.171	223.357	2.8	92.7
	2014	180.807	34.285	8.407	202.346	2.5	87.2
	2015	190.000	63.800	7.917	241.323	3.0	76.8
	2016	195.000	66.008	8.167	248.161	3.0	76.7
	2017	210.000	77.382	7.185	275.157	3.3	74.5
	2018	215.000	103.345	30.330	282.855	3.4	74.2
	2019	225.000	90.525	8.180	301.945	3.5	72.7
2020	286.706	100.095	33.747	346.173	4.0	80.8	
Pistachio	2011	112.000	58	3.172	106.086	1.4	102.9
	2012	150.000	139	15.289	131.100	1.7	111.6
	2013	88.600	277	5.633	81.029	1.0	106.6
	2014	80.000	52	4.971	73.081	0.9	106.7
	2015	144.000	118	13.887	126.631	1.5	110.9
	2016	170.000	150	12.736	153.164	1.8	108.2
	2017	78.000	218	6.575	69.693	0.8	109.1
	2018	240.000	19.417	39.101	214.316	2.5	109.2
	2019	85.000	198	11.986	71.087	0.8	116.6
2020	296.376	20.132	50.820	258.279	3.0	111.9	
	2011	60.270	222	3.750	53.005	0.7	106.7

Chestnut	2012	57.881	82	5.445	48.929	0.6	111
	2013	60.019	340	5.839	50.799	0.6	110.8
	2014	63.762	585	10.567	49.827	0.6	120
	2015	63.750	123	6.473	53.448	0.7	111.9
	2016	64.750	196	7.432	53.500	0.7	113.5
	2017	62.904	956	10.551	49.409	0.6	119.4
	2018	63.580	1.813	12.865	48.586	0.6	122.7
	2019	72.655	2.231	14.025	56.356	0.7	120.9
	2020	76.045	2.238	9.305	64.263	0.7	111

TÜİK, 2022

The balance table showing the production, import, domestic utilization, per capita consumption, and sufficiency level of fruits with nuts is shown in Table 4. According to this table, production, exports, domestic use, and per capita consumption of all fruits in this group have increased in the last ten years, but the fruits have differed in the rate of increase. This group's sufficiency level of fruits was 552.9% for hazelnut, 111.9% for pistachio, 81.9% for almond, 80.8% for walnut, and 111% for chestnut (TÜİK, 2022).

4. PROBLEMS OF FRUIT GROWING AND SOLUTION SUGGESTIONS

When the production, import, domestic utilization, per capita consumption, and sufficiency levels of fruits are analyzed, it is seen that Türkiye has increased self-sufficiency. However, there is a need to plan the production of fruit and vegetable products in the quality required by the markets. In addition to increased production, there is a need for developing product markets, permanent and stable institutions, and activities to regulate the markets.

Production of fruits, beverages, and spice plants, which have a share of over 30 percent in crop production, has shown significant increases over the years. Fruit planting area tends to increase despite the decrease in cultivated area. However, apart from production, quality problems persist. Therefore, it is difficult to provide products suitable for changing market demands which can be supplied to the market for a long time.

Global warming and related temperature changes affect fruit production. Since temperature increases will increase water losses from the soil and plant surface, plants will be exposed to abiotic stresses such as drought and salinity. As a result, losses will occur according to the time, severity, and duration of stress. Water deficiency that may occur during critical development periods of plants, such as flowering, pollination, and fertilization, will cause a significant decrease in yield and quality. This situation will necessitate improving and producing more drought-resistant varieties and the application of tillage and cultivation techniques for more effective containment and storage of rainwater in the soil (Ministry of Development, 2018). Therefore, planning lands for production, cultural practices in plant cultivation, and management of water resources will come to the fore. In this context, issues such as control of water use, storage of water, development of efficient irrigation technologies, and sustainable planning of water resources will become priorities. In addition to these adverse effects of climate change, some positive effects of climate change are also expected, such as increased yields in some crops,

shorter growing periods due to the increase in temperature, shifting cultivation areas further north, the possibility of early planting and harvesting, and the ability to grow some plants that are currently grown in hot regions in temperate regions (Ministry of Development, 2018).

Apart from these general problems, some problems have persisted over the years regarding fruit growing in Türkiye. These can be listed as follows; the fact that fruit cultivation is done with seeds and therefore standardization in production and quality is not ensured, the fact that companies producing saplings have true-to-type breeding plots, problems in the supply of plant material, in other words, in the field of arboriculture, the fact that production is not carried out with true-to-type standard varieties with known yield and fruit quality, scarcity of orchards containing one type of crop, insufficient and incorrect technical and cultural practices, mistakes made in terms of fertilization biology, which is a crucial issue in fruit growing, wrong harvesting practices that lead to significant product losses and marketing problems.

The generally small and fragmented structure of agricultural holdings is a factor that applies to all areas of fruit production. This situation limits the need for modern agricultural methods in orchards established with some species in nuts fruit cultivation. Healthy and true-to-type seedlings should be used in fruit growing. Arboriculture activities should be emphasized in nuts fruit production, and variety and clone rootstock breeders should be established. In order to increase

production and especially to have a say in global trade, gardens should be established with varieties that produce early and high-quality products, have good resistance to diseases and pests and have marketable high quality and high yield per decare. In the gardens to be established, new cultivation methods should be applied, and classical production systems should be abandoned.

Following new cultivation methods and their gradual introduction into production will not only increase the incomes of many producers. However, it will also have the advantage of reducing production costs and, ultimately, making us more competitive in the markets. However, at this point, public and private sector institutions and organizations should cooperate to determine new cultivation methods and varieties and reach the producers.

As in every fruit species, diseases and pests seriously affect production and yield in nuts fruit species. Some of these diseases and pests are caused by nutritional problems. At this point, producers should be primarily made aware of plant nutrition. A fertilization program based on soil and leaf analysis should be implemented, and modern techniques such as fertigation should be encouraged. Pesticides are intensively used in the fight against diseases and pests. This situation closely concerns every segment of society regarding health and environmental pollution. Unconscious spraying and fertilization can indirectly cause environmental pollution and cause financial losses for producers. However, with the widespread adoption of 'Integrated Fruit Production'

techniques and the introduction of ecological agricultural practices, the risk of environmental pollution and financial losses for producers will be considerably reduced. Production quantity, industry quality, infrastructure, finance, and market conditions should be improved to be among the producing countries and compete with other countries in exports with other nuts fruits other than hazelnuts.

In order to avoid early or late harvesting, producers should be informed on how to determine the harvest time correctly and practically. For this purpose, practical training and educational meetings should be organized on how to determine the harvest period and how to harvest.

In order to ensure maximum standardization in production, classification and packaging facilities should be established. Furthermore, a system where all producers can benefit from these facilities should be established.

CONCLUSION

Fruit growth has shown significant developments in recent years. In some fruit species, this increase has been significant both in terms of area and production amount. The essential factors in this development are; developments in the production and marketing process, consumer demands, increased export opportunities, and the use of new techniques and technologies related to the extension of shelf time. In today's world, where agriculture and food safety are becoming more critical, all stakeholders of the relevant sectors must take all necessary measures by following a planned, scientific and rational path for the further development and progress of fruit growing. According to the adequacy of fruits for the country in fruit cultivation, it is noteworthy that some fruits are overproduced, and some are underproduced. It is necessary to increase the per capita consumption of fruits in the country by taking into account the health and nutrition aspects of fruits, to increase new market and export opportunities in fruits where we have surplus production, to bring a new breath and perspective to fruit growing by solving production problems with our universities, trained qualified personnel and farmer training. The potential of our country is suitable for this. With a planned and scientific perspective, fruit growing will continue its development by increasing its importance.

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