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TECHNICAL EXAMINATION AND FUTURE OF APRICOT PRODUCTION IN ISPARTA, TURKIYE

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Abstract

The aim of this study was to examine the technical applications and future expectations of the apricot growing enterprises in Isparta within the framework of their socio-demographic characteristics. The main material of the research was the data obtained by the survey method from 138 apricot farms located in the villages where apricot cultivation is intense in Yalvaç and Senirkent districts in Isparta province. The data obtained belonged to the production season of 2021. The farms used 1.97 hours of machine power, 27.57 hours of family labour and 27.00 hours of foreign labour per decare in apricot production. They applied 8.86 kg nitrogen, 12.92 kg phosphorus and 4.33 kg potassium as pure substance per decare in apricot orchards. There is a tendency for farms to continue apricot cultivation in the research region. In the region, land fragmentation was high and small-scale enterprises were dominant. Therefore, the awareness that natural resources are not unlimited should be increased and measures should be taken to protect soil and water. In addition, producer organization culture should be developed and encouraged. In order to prevent unconscious/wrong choices and practices of the producers, it is considered important to increase and expand the consultancy services provided by the institutions and organizations related to the agricultural sector.

Key words**:** *apricot, input, problems, future, Isparta*

INTRODUCTION

In terms of production and exports of apricots, Turkey has a significant position. In terms of production and export, it comes in first place worldwide [1][10].

Various economic studies have been carried out on apricot in Turkey. For example, Demirtaş [5] made an economic analysis of apricot in Mersin. Demirtaş and Gül [6] examined the socio-economic characteristics of apricot farms in Mersin province. Dellal and Koç [4] estimated an apricot supply model and a dried apricot export demand model for Turkey to provide unitless measurement coefficients for better supply and marketing management. They calculated the long-run supply, price-yield and export elasticities of dried apricot as 0.72, 0.54 and -0.87, respectively. They calculated the export demand price elasticity of dried apricot as -0.71. Gündoğmuş [12] examined 10 conventional and organic apricot farms in Turkey for production, profitability, producer-defined limitations and objectives, and research interests. Three of the organic farms claimed to have produced as much as or more than their conventional counterparts, but overall, the three-year average output of organic farms was 9% lower. The average variable expenses and net revenue for both groups, when organic certification fees were excluded, were comparable because the farmers' organic price premiums made up for the reduced yields. Olgun and Adanacıoğlu [15] examined the production and marketing of organic dried apricots in Turkey. They also talked about the outcomes of a poll of Malatya's apricot growers. Production of dried apricots in organic form was not common on the farms they examined. The majority of the producers had learned about the manufacture of dried apricots that were produced organically via friends, neighbours, and control and certification organisations. Çukur et al. [3] evaluated the views of apricot producers on risk transfer and the new agricultural insurance law in Malatya

Doğanşehir Polatdere Village. In order to determine the causes of cost inefficiency, Gündüz et al. [13] analyzed the efficiency metrics of dried apricot farms in Turkey's Malatya area. To gauge efficiency, Data Envelopment Analysis (DEA) was performed. The sample farms in the first group had average technical, allocation, and cost efficiencies of, respectively, 0.738, 0.760, and 0.558. These numbers were 0.905, 0.762, and 0.697 in the second group. They found that the level of education of the farm owner and non-agricultural income had a negative effect on cost inefficiency, while tractor ownership, the ratio of apricot land size to farm size, the number of apricot trees and marketing cost variables had a positive effect on cost inefficiency. Uçar and Saner [23] determined whether organic and conventional apricot cultivation is economically viable in Malatya province of Turkey. Data were collected through a questionnaire in Malatya. Organic and conventional apricot investment project values were calculated as profitable. They subjected the two project results to sensitivity analysis and found that the parameters were subject to variability in costs and revenues (20% cost increase, 20% revenue decrease) under various conditions. Gül and Özen [11] investigated the effect of agricultural credit utilisation on socio-economic indicators of apricot producers in Mut district of Mersin province. Özen and Gül [16] reported that a significant portion of the apricot produced in Mut district is utilized in the domestic market and mostly consumed fresh.

The financial viability of investing in apricots in Turkey's Malatya area was examined by Uçar and Engindeniz [22]. In the 2012–2013 crop year, the researchers conducted in-person interviews with 159 farmers in the central, Akçada, and Darende districts of Malatya province. They found that the Net Present Value was positive, the Benefit Cost Ratio was greater than 1 and the Internal Rate of Return was 16%.

Isparta has 0.83% of Turkey's total land area and 0.75% of the agricultural areas cultivated throughout the country. In Isparta, 20% of the total land area is fruit areas. It ranks 31st with a share of 1.26% in plant production in Turkey. Isparta has 1.1% of Turkey's fruit planted areas [20].

Apricot production is developing in Isparta province. This is among the reasons why Isparta province was selected as the research region. However, there are insufficient researches for the province evaluating farm practices in the province on the subject.

In this framework, in this study; (i) production techniques used in apricot cultivation by apricot farms in the research region, (ii) education, age, number of family members, crop production experience of farms, (iii) apricot varieties grown, (iv) inputs used in production, (v) information on the future of apricot cultivation in Isparta province in line with the information obtained from apricot producing farms were aimed to be examined.

MATERIALS AND METHODS

In the study, apricot planting area and production values among the districts of Isparta province were analyzed at the stage of determining the research region. As a result of the examination, Yalvaç and Senirkent districts, which meet more than half of the production in terms of planting area (91%) and production (87%), were determined as the research region. The main material of the study consisted of primary data obtained from apricot producing farms in these districts by face-to-face survey method.

Stratified sampling Neyman method was used to determine the number of farms interviewed and it was found that the number of samples representing the main population was 138 with a margin of error of 5% and 99% confidence interval. A total of 138 apricot farms were surveyed in Aşağıkaşıkaşıkara, Yukarıkaşıkara, Taşevi, Aşağıtırtar, Yukarıtırtar, Kumdanlı villages in Yalvaç district and Gençali and Büyükkabaca villages in Senirkent district. These data belonged to the 2021 production period.

In the Neyman method, since more samples were taken from the stratum with high variance, the arithmetic mean applied in the calculations would not reflect the average of

the research area, the coefficient calculation was made for each stratum by proportioning the number of frequencies falling into the farm strata to the total number of frequencies. In the research, the data obtained for each stratum were multiplied by the calculated coefficients and the general farm average value was calculated as the regional average [8] [9].

Apricot farms were divided into three groups. The farms with apricot planting area of 7.50 decares (1 decare equal 0.1 hectare) or less (21 farms) were defined as group I. group, II. group farms had apricot planting area between 7.51-20.00 decares (55 farms). Group III farms were defined as farms with apricot planting area of 20.01 and more decares (62 farms).

The socio-demographic characteristics of the producers, apricot production structure of the farms, input use, problems encountered during the production phase and solution suggestions for the elimination of these problems and the data obtained for the development of apricot production were cross tabulated and analyzed with apricot planted area groups.

RESULTS AND DISCUSSIONS

In line with the information obtained as a result of the interviews, the average age of apricot producers was determined as 55.07 years. The regional average was found to be 56.74 years. The average age of the operators in the first stratum was found to be 60.43 years, the second stratum 54.98 years and the third stratum 53.32 years. The average education level of the producers in the enterprises was found to be 7.71 years. The average agricultural production experience of apricot producers was 25.48 years, while the regional agricultural production experience was 24.57 years. The average experience of the producers in apricot cultivation was found to be 21.28 years. While the average apricot cultivation experience in the region was 19.85 years, it was found to be 17.29 years in the first stratum, 20.91 years in the second stratum and 22.97 years in the third stratum (Table 1).

Demirtaş [5] found that the average age of apricot farmers in Mersin province was 50.00 years and the duration of apricot farming experience was 18.3 years. Fidan [7] calculated the average age of apricot farmers in Iğdır province as 47.58 years and their apricot farming experience as 14.28 years. Sarıbaş [17] calculated the average age of apricot farmers in Malatya province as 46.57 years and their apricot farming experience as 25.58 years. Uçar [21] determined the average age of apricot farmers in Malatya province as 52.36 years, their apricot cultivation experience as 27.67 years and their agricultural experience as 29.57 years. Çatı [2] determined the age of the operators engaged in organic apricot production in Malatya province as 53.05 years.

Of the farms examined, 2.17% had received training on apricot cultivation. While the farms in the first stratum did not receive training on apricot cultivation, 1.82% of the farms in the second stratum and 3.23% of the farms in the third stratum received training. It was determined that the operators received training from district agriculture and forestry directorates, agricultural engineers and public education centre courses.

Of the farms analyzed, 17.39% were engaged in cattle breeding, 5.07% were engaged in small ruminant breeding and 3.62% were engaged in both cattle and small ruminant breeding. It was determined that 73.91% of the farms did not engage in animal husbandry. It was determined that 9.52% of the farms in the first stratum were engaged in animal husbandry, 21.82% of the farms in the second stratum and 35.48% of the farms in the third stratum were engaged in animal husbandry.

It was determined that 21.01% of the farmers had agricultural income outside their farms. The rate of farms having non-agricultural income was 90.48% in the first stratum, 69.09% in the second stratum and 75.81% in the third stratum. 97.10 percent of the farmers had social security. In addition, it was determined that 60.87% of the farmers were retired. According to the planted area width, 76.19% of the farmers in the first stratum, 60.00% in the second stratum and 56.45% in

the third stratum were retired. Therefore, a large proportion of the non-agricultural income of the farmers was due to this situation.

It was found that 33.33% of the analyzed farms kept records about the operations they performed during the apricot production process. 23.81% of the farms in the first stratum, 23.64% in the second stratum and 45.16% in the third stratum were doing this.

All of the farmers interviewed owned a mobile phone. 16.67 percent of the farmers had computers and 65.22 percent had internet. The rate of computer ownership was 14.29% in the first stratum, 14.55% in the second stratum and 19.35% in the third stratum. The rates of internet ownership were 42.86%, 61.82% and 75.81% in the strata, respectively (Table 1).

While the average number of tractors of the farms analyzed was 0.83, this value was 0.71 in the average of the region. The tractor model became newer as the apricot planted area increased. The average number of spraying machines in the farms was 0.84 while it was 0.74 in the regional average. As the apricot planted area increased, the number of machinery-equipment of the farms also increased. The farm group with the highest number of machinery-equipment was in the third stratum. The use of drone was determined as 0.02 units in the farms in the third stratum.

It was determined that 40.58% of the analyzed farms used agricultural loans. The rate of credit utilization according to planted area width was 28.57% in the first stratum, 36.36% in the second stratum and 48.39% in the third stratum. As the scale of the enterprise increased, the rate of credit utilization also increased. Enterprises obtained credit from public and private banks and Agricultural Credit Cooperatives. Of the farms that used credit, 75% used credit for crop production, 19.64% used credit for special needs, 3.57% for machinery-equipment purchase and 1.79% for animal production.

Demirtaş [5] reported that 30.68 percent of the apricot farms in Mersin province used credit for apricot production. Gül and Özen [11] determined that 32.97% of the surveyed farmers used agricultural credits in Mersin.

The average household size in the surveyed farms is 3.54 persons. The regional average was determined as 3.13 persons. The household size of the first stratum farms was 2.71 persons, 3.20 persons in the second stratum and 4.13 persons in the third stratum. It was determined that the household size increased as a result of the increase in farm size (Table 1).

The average household population of the farms was 47.03 percent female and 52.97 percent male. In the farms analyzed, 3.39% of the average family population was 0-6 years old, 12.13% was 7-14 years old, 43.18% was 15-49 years old and 41.20% was 50 and over.

Demirtaş [5] determined the average population of apricot farms in Mersin province as 5.43 persons. He calculated that the family population varied between 4.70 and 5.82 people according to enterprise groups. Fidan [7] determined the household size of apricot farms in Iğdır province as 4.74 persons and calculated that the average family population varied between 4.40 and 4.97 persons according to enterprise groups. Sarıbaş [17] found it as 4.41 persons in his study conducted in Malatya province.

Table 1. Age, education level and experience of producers in the farms analysed

	I	II	III	FA	RA
Farmers age (year)	60.43	54.98	53.32	55.07	56.74
Farmers education level (year)	7.48	8.18	7.37	7.71	7.84
Household size (head)	2.71	3.20	4.13	3.54	3.13
Experience in agriculture (years)	22.57	25.51	26.44	25.48	24.57
Experience in apricot production (year)	17.29	20.91	22.97	21.28	19.85
Participation in training activities for apricot cultivation (%)	0.00	1.82	3.23	2.17	1.33
Record keeping in apricot growing (%)	23.81	23.64	45.16	33.33	26.19
Non-farm income (%)	90.48	69.09	75.81	75.36	77.51
Off-farms agricultural income (%)	4.76	23.64	24.19	21.01	16.96
Computer ownership (%)	14.29	14.55	19.35	16.67	15.01
Internet ownership (%)	42.86	61.82	75.81	65.22	56.66
Agricultural credit utilisation rate in farms (%)	28.57	36.36	48.39	40.58	34.97

FA: Farm Average, RA: Regional Average
Source: Own calculation.

Household size was found to be lower in the study region compared to the studies conducted in other regions. The reason for

this was that the number of households in the 0-6 and 7-14 age groups was quite low. At the same time, the proportion of the age group of 50 years and over was higher compared to other studies.

This situation showed that the young population in agriculture was decreasing.

In the farms, 62.16% of the family population were primary school graduates, 13.11% were secondary school graduates, 14.80% were high school graduates, 2.96% were college graduates and 6.98% were university graduates.

The limited factor in increasing agricultural products is agricultural land. The basic condition for obtaining more yield from unit area and increasing production is the improvement of enterprise structures consisting of very fragmented and small units. For all these, land consolidation is necessary. Thanks to land consolidation, the number of parcels will decrease, the average parcel size will increase, farms will reach a certain economic scale and infrastructure works for farms will be realized [14].

In agricultural production, land is extremely important in terms of agricultural mechanization elements, production, product yield, quality and other elements. In this direction, the number of parcels, average parcel size, irrigation status, land saving patterns and crop patterns of the farms examined were examined.

The average number of parcels of the farms analyzed in the research region was 6.02. The average number of parcels in the region was 4.27. The average number of parcels in the first stratum was 2.43, in the second stratum 4.60 and in the third stratum 8.50. The average parcel size of the farms was 5.65 decares. The average parcel size of the region was 4.58 decares. The average parcel size of the farms in the first stratum was 2.99 decares, 4.36 decares in the second stratum and 6.53 decares in the third stratum. The number of plots and plot size increased with the width of the planted area of the farms.

Demirtaş [5] determined the average number of plots of apricot farms in Mersin province as 3.53 and the average plot size as 13.92 decares. Fidan [7] found that the average number of plots of apricot farms in Iğdır province was 3.49 and the average plot width was 14.53 decares. Uçar [21] calculated the average land width as 52.68 decares, the average number of parcels as 5.79, and the average parcel width as 9.83 decares in Malatya province. Çatı [2] found the average land holding in Malatya province as 57.9 decares.

The average number of parcels in the research area was lower than the number of parcels determined in other studies. This showed that the land in the region was very fragmented.

The average irrigable land of the farms analyzed was 33.99 decares. Irrigable land within the total land was 95.08% in the first stratum farms and 100% in the second and third strata (Table 2).

The irrigation status of the lands in the research region was found to be higher than the other regions.

It was determined that 93.76% of the total land holdings of the farms consisted of owned land. While the proportion of rented land was 1.28%, the proportion of jointly managed land was found to be 4.96%. The farms in the first and second stratum did not have any land held for rent and co-operation, while the third stratum had land held for rent and co-operation depending on the width of the planted area. Due to the scarcity of land in the study area, the rate of renting and co-operative land cultivation remains at a very low level (Table 2).

Demirtaş [5] found that 91.63% of the farms producing apricot in Mersin province consisted of owned land, while the proportion of land operated by renting and co-ownership was very low. Fidan [7] found that 72.78% of the apricot farms in Iğdır province had property land and 27.22% had land operated by renting and co-ownership. Uçar [21] found that in apricot farms producing apricot in Malatya province, there was no land cultivated by renting and sharecropping, and all of the farm land consisted of property land.

When the production pattern of the farms in the research area was analysed, the largest production area within the farm land belonged

to apricot gardens with 28.63 decares. Apricot production area was 5.86 decares in the first layer, 15.65 decares in the second layer and 47.85 decares in the third layer. After apricot, the most produced product was apple with 4.94 decares. It was determined that 83.98% of the farm land was apricot production area. Apricot was followed by apple with 14.49%, sugar beet with 1.12%, plum with 0.23% and peach with 0.06%.

The average number of apricot land parcels of the farms examined was determined as 5.25 pieces. The regional average was found as 3.72 parcels. The average number of parcels in the first stratum was 2.19, 3.93 in the second stratum and 7.47 in the third stratum (Table 2).

The average parcel size for apricot planted areas of the enterprises was 5.44 decares. The average parcel size in the region was 4.26 decares. The average parcel size in apricot planted areas was 2.67 decares in the first stratum, 3.96 decares in the second stratum and 6.41 decares in the third stratum. It was observed that there was a positive relationship between the apricot planted area group and the number and size of pieces.

Demirtaş [5] found that the average number of apricot orchard plots of apricot producing farms in Mersin province was 1.49 pieces and its width was 15.19 decares. Fidan [7] calculated the number of apricot garden plots of apricot farms in Iğdır province as 1.13 pieces and the width of the plots as 8.12 decares. Uçar [21] calculated the average apricot area of apricot farms in Malatya province as 26.41 decares. Çatı [2], in his study conducted in Malatya province, determined the average apricot area of farms producing organic apricot as 41.6 decares.

The average number and width of apricot parcels in the research region were generally lower than other studies.

The total land size of the farms analyzed was found to be 28.63 decares. There was no land operated with rent in the interviewed farms. Apricot planted areas cultivated in partnership were 1.73 decares. In the enterprise groups, apricot planted areas cultivated in partnership were found in the farms in the third stratum (Table 2).

In the average of the farms examined, 93.95% of the apricot planted areas consisted of property land. In apricot farming, where there is no land operated with rent, the share of apricot planted areas cultivated by partnership was calculated as 6.04%. It was determined that the share of land cultivated in partnership increased with the increase in the scale of the enterprise. All of the apricot lands of the farms in the first and second strata are property lands. In the farms in the third stratum, 92.15% of the apricot planted areas of the farms in the third stratum were property land and 7.85% were jointly managed land (Table 2).

Apricot production on farms

The average apricot production in apricot farms in the research area was 93,509.09 kg (Table 2).

Apricot yield per decare was determined as 3,266.07 kg. Apricot yield per decare was 2,343.11 kg in the first layer, 2,697.25 kg in the second layer and 3,469.40 kg in the third layer (Table 2).

The average total number of trees was 1,023.67 and the number of fruiting trees was 935.57 trees. The number of fruit bearing trees in the first stratum was 185.67, in the second stratum 454.78 and in the third stratum 1 616.08. The number of trees increased with the width of the planted area (Table 2).

The average yield per tree in the farms was 91.35 kg. The yield per tree was 71.64 kg in the first stratum, 89.07 kg in the second stratum and 92.59 kg in the third stratum (Table 2). The reasons for the different yields per unit area and per tree in the farms examined were climatic conditions (late spring frosts), establishment of apricot orchards in unsuitable areas, differences in rootstock varieties, proportional distribution of apricot varieties in planted areas, presence of new varieties and different tree ages.

Demirtaş [5] determined the average yield per decare of apricot farms in Mersin province as 372 kg and the average yield per tree as 25 kg. Fidan [7] calculated the yield per decare of apricot farms in Iğdır province as 1,281 kg.

Sarıbaş [17] found the average yield per decare of apricot farms in Malatya to be 902 kg. Uçar [21] calculated the total number of trees of apricot farms in Malatya province as 247.45 and the number of apricot trees per decare as 9.37, and determined the average fresh apricot production as 23,168.34 kg, yield per decare as 877.26 kg and yield per tree as 93.63 kg. Çatı [2] calculated the average yield of farms producing organic apricot as 1,281 kg in Malatya province.

The apricot planted area width of the enterprises and the number of apricot trees per unit area differ. The average number of trees per decare in the farms was 35.75. The number of trees per decare was 32.71, 30.28 and 37.47 in the first, second and third stratum, respectively (Table 2).

Table 2. Various characteristics of farms

	I	II	III	FA	RA
Operating land (decares)	7.26	20.07	55.52	34.05	19.59
Property land (%)	100.00	100.00	91.49	93.76	97.21
Irrigated land (%)	95.08	100.00	100.00	99.84	99.35
Number of land parcels (pcs)	2.43	4.60	8.50	6.02	4.27
Share of apricot planted area in total enterprise land (%)	80.66	77.57	86.20	83.98	80.79
Share of apple planted area in total enterprise land (%)	18.03	20.63	12.35	14.49	17.58
Number of apricot parcels (pcs)	2.19	3.93	7.47	5.25	3.72
Apricot area (decare)	5.86	15.65	47.85	28.63	15.87
Total number of apricot trees (pcs)	191.57	474.07	1 793.06	1 023.67	525.54
Number of fruit-bearing apricot trees (number)	185.67	454.78	1 616.08	935.57	492.81
Total apricot production (kg)	13 723.90	42 224.25	166 027.71	93 509.09	46 346.52
Apricot yield (kg per decare)	2 343.11	2 697.25	3 469.40	3 266.07	2 919.53
Apricot yield (kg per tree)	71.64	89.07	92.59	91.35	88.19
Apricot tree number per decare	32.71	30.28	37.47	35.75	33.11

Source: Own calculation.

Demirtaş [5] found that the average number of trees per decare in farms producing apricot in Mersin province was 14.81. Uçar [21] calculated the total number of trees in apricot farms in Malatya province as 247.45 and the number of apricot trees per decare as 9.37. Çatı [2] calculated the average number of trees of farms producing organic apricot as 399.6 trees and the average number of trees per decare as 9-10 trees in Malatya province.

The number of trees per decare in the research area was found to be higher than the number of trees determined in other studies. The number of trees per decare was also found to be different due to different planting intervals.

Apricot varieties and yields grown in farms

Among the apricot varieties grown by the interviewed farms, Şekerpare, Roxana, Aprikoz, Orange Ruby and Alyanak varieties were determined as the most produced varieties. According to the average of the farms, 23.11% of the total apricot area of 28.63 decares was Şekerpare, 21.20% was Roxana, 16.34% Aprikoz, 11.68% Orange Ruby, 11.38% Alyanak, 6.86% Milörd, 3.24% was Memphis varieties (Table 3).

According to the enterprise groups, the share of Şekerpare variety in apricot planted area was 21.95% in the first layer, 21.96% in the second layer and 23.49% in the third layer. Roxsana variety was 27.24% in the first layer, 24.40% in the second layer and 20.02% in the third layer. Aprikoz (shalak) variety had a share of 17.48% in the first layer, 20.68% in the second layer and 15.03% in the third layer. Orange Ruby variety had a share of 11.79% in the first layer, 14.17% in the second layer and 10.95% in the third layer. Alyanak variety had a share of 18.29% in the first layer, 11.97% in the second layer and 10.92% in the third layer. Milörd, which is one of the new varieties and is generally an export product, was the most renewed apricot variety in the third layer with a share of 8.97%. Apricot producers uprooted the old varieties and planted varieties such as Bebeco, Prisya, Oscar, Rubista, Flopria, Farbaly, Bigred and Bolero in order to produce high-yielding and export-oriented varieties instead

of the varieties that they could not get the desired yield (Table 3).

Demirtaş [5] found that the apricot varieties grown in farms producing fresh apricots in Mersin province were 32.10% of I. Tokalı, 22.47% of Septic, 15.23% Tyrinthe, 13.14% Tokaloğlu, 11.51% Karacabey, 5.55% Şekerpare. Fidan [7] determined the varieties grown in apricot farms in Iğdır province as Şalak, Tebereze, Ağerik. Sarıbaş [17] determined the apricot varieties of the farms producing apricots in Malatya province as Hacıhaliloğlu, Kabaaşı, Hasanbey, Çataloğlu, Soğancı. Çatı [2] determined the apricot varieties grown by farms producing organic apricots as Hacıhalil, Kabaaşı, Çataloğlu in Malatya province. According to calculations by Özen and Gül (2020), the apricot cultivar "Alyanak" came in top place with 32.27%. With 22.32%, the "Tyrinthe" cultivar came in second, while the "Bebeko" cultivar, with 15.42%, came in third. The "Şekerpare" cultivar had the lowest cultivation rates among the farmers surveyed in the province of Mersin, at 4.15%.

Apricot cultivars grown for table use in the study area were found to be different from the cultivars identified in other studies. In the studies carried out in Malatya region, varieties for drying were generally grown more. It was determined that too many apricot varieties were grown in the research region.

Table 3. Apricot varieties grown in enterprises

Varieties	Strata groups			FA	RA
	I	II	II		
	Proportion (%)				
Şekerpare	21.95	21.96	23.49	23.11	22.49
Roxsana	27.24	24.40	20.02	21.20	23.25
Aprikoz	17.48	20.68	15.03	16.34	18.29
Orange Ruby	11.79	14.17	10.95	11.68	12.74
Alyanak	18.29	11.97	10.92	11.38	12.44
Milörd	0.00	0.58	8.97	6.86	3.43
Memphis	0.00	1.74	3.81	3.24	2.23
Karacabey	0.00	1.51	0.13	0.43	0.83
Bebeco	3.25	0.58	1.31	1.21	1.19
Prisya	0.00	0.58	2.97	2.35	1.34
Oscar	0.00	0.00	0.17	1.01	0.47
Rubista	0.00	0.58	0.57	0.56	0.50
Flopria	0.00	0.70	0.17	0.28	0.42
Farbaly	0.00	0.58	0.10	0.20	0.34
Bigred	0.00	0.00	0.17	0.13	0.06
Bolero	0.00	0.00	0.03	0.03	0.01
Total	100.00	100.00	100.00	100.00	100.00

Source: Own calculation

The total number of trees in apricot orchards in the research area was 1,023.67 and the number of fruit bearing trees was 935.57. Among the apricot varieties which have a large share in production, Şekerpare variety had 180.34 trees out of 205.79 trees, Roxsana variety had 177.51 trees out of 198.53 apricot trees, Aprikoz variety had 122.14 trees out of 122.48 trees, Orange Ruby variety had 121.64 trees out of 136.21 apricot trees, Alyanak variety had 90.44 trees out of 91.31 trees and Milörd variety had 103.78 trees out of 126.25 trees.

The average tree age of Aprikoz (shalak) variety, which is the oldest cultivated variety in the region, was 16.78 years, Alyanak 11.36 years, Şekerpare 10.23 years, Roxsana 9.28 years, Orange Ruby 4.20 years. Since the other apricot varieties were new varieties, the tree ages were quite low.

Çatı [2] determined the average age of the trees grown by farms producing organic apricot as 15.4 years in Malatya province.

The yields obtained from apricot varieties were determined as Alyanak 101.41 kg, Şekerpare 95.76 kg, Aprikoz 87.99 kg, Roxsana 86.82 kg, Orange Ruby 35.73 kg, Bebeco 6.92 kg, Karacabey 4.60 kg, Milörd 1.72 kg per tree. It was thought that high yields would be obtained from other varieties in the following years if the climatic conditions were good. The highest yields were realized in the farms in the third stratum. Alyanak, one of the important varieties, yielded 52.38 kg per tree in the first layer, 71.18 kg in the second layer and 144.84 kg in the third layer.

The yield per tree of Şekerpare variety was 39.48 kg in the first layer, 82.24 kg in the second layer and 126.82 kg in the third layer, while the yield per tree of Aprikoz variety was 42.38 kg in the first layer, 77.33 kg in the second layer and 112.90 kg in the third layer; the yield per tree of Orange Ruby variety was 19.57 kg in the first layer, 31.27 kg in the second layer and 45.16 kg in the third layer.

Demirtaş [5] determined the yield per tree in farms producing apricot in Mersin province as 66 kg for I. Tokalı variety, 56 kg for Septik, 63 kg for Tyrinthe, 59 kg for Tokaloğlu, 61 kg for Karacabey and 59 kg for Şekerpare variety. In order to realise fruit production with the desired quality and yield in fruit

growing, it is necessary to pay attention to issues such as the number of trees, rootstock selection and planting spacing.

When the planting spacing of the apricot orchards of the farms examined was analyzed, 27.86% of the orchards were planted with 7 m x 7 m planting spacing, 25.76% with 6 m x 6 m and 14.89% with 5 m x 5 m planting spacing. It was determined that there were many different planting spacing practices in the region. The rate of farms with 4 m x 5 m planting spacing was 4.39%, 5 m x 4 m planting spacing was 3.63%, 5 m x 6 m planting spacing was 3.44% and 6 m x 5 m planting spacing was 3.24%. Other planting spacings were 3.5 m x 3.5 m, 5.5 m x 6 m, 5 m x 7 m, 6.5 m x 6.5 m, 3 m x 5 m, 5.5 m x 5.5 m, 6 m x 7 m, 5 m x 7 m, 8 m x 8 m, 10 m x 10 m, 9 m x 7 m. Since the enterprises did not have sufficient knowledge about planting spacing, they kept the planting spacing too wide during the establishment period. However, in recent years, the producers, whose level of knowledge and awareness has increased, changed the planting method and rootstock of their gardens with wide planting intervals and started to plant more frequently.

Demirtaş [5] found that 58.4% of the apricot farms in Mersin province established gardens with 8 m x 8 m, 23.7% with 7 m x 7 m or more planting spacing. Uçar [21] determined that 43.67% of apricot farms in Malatya province established gardens with 10 m x 10 m, 39.87% with 11 m x 11 m, 5.70% with 8 m x 8 m planting spacing.

In addition to the similarities between the planting spacings in the research region and the planting spacings in other studies, very different planting spacings were found in the research region compared to other regions. Factors such as the structure of the planted tree, soil tillage, pruning, spraying, knowledge of the grower were effective in the difference of planting intervals.

Apricot varieties produced in the region are table varieties. In order to increase product yield and quality, to avoid being affected by adverse climatic conditions, to respond to changing consumer preferences, to facilitate production, maintenance, harvesting and marketing processes, the sapling varieties that apricot producers have recently planted are generally semi-dwarf apricot varieties. Accordingly, there were also newly planted apricot trees in the farms.

Technical applications of farms in apricot cultivation

In the farms examined, tillage in apricot cultivation starts in March-April and continues until October-November. Hoe, plough, crowbar, chisel, disc plough, disc harrow, rotovator were used in tillage.

The average number of tillage in the interviewed farms was 3.23 times, while the regional average was 3.16 times. The farms in the first stratum used tillage 2.86 times, in the second stratum 3.35 times and in the third stratum 3.26 times (Table 4).

Demirtaş [5] found that farms producing apricot in Mersin province cultivated the soil an average of 2.45 times per year.

In the research region, fertilization was carried out in autumn and spring seasons with solid and liquid fertilizers. Nitrogen, phosphorus, potassium and potassium were found to be 8.86 kg, 12.92 kg and 4.33 kg per decare, respectively. Nitrogen, phosphorus and potassium were 248 g, 361 g and 121 g, respectively, per tree. According to the enterprises, nitrogen, phosphorus and potassium use per decare were calculated as 8.75 kg, 11.93 kg and 4.21 kg in the first layer. In the second stratum, nitrogen, phosphorus and potassium use per decare were 8.91 kg, 13.24 kg, 4.87 kg and in the third stratum 8.85 kg, 12.86 kg, 4.18 kg, respectively (Table 4).

Demirtaş [5] found that farms producing apricot in Mersin province used an average of 11.76 kg nitrogen, 10.48 kg phosphorus and 5.12 kg potassium per decare as pure matter. Fidan [7] calculated that an average of 6.15 kg nitrogen and 8.7 kg phosphorus were used per decare as pure matter in Iğdır province. Uçar [21] determined the amount of fertilizer used as pure matter per tree per decare in Malatya province as 0.31 kg nitrogen, 0.19 kg phosphorus and 0.25 kg potassium.

The rate of foliar fertilizer use in the farms examined was found to be 9.17% in the first

layer, 30.28% in the second layer and 60.55% in the third layer. As the apricot planted area increased, the rate of foliar fertilizer use increased (Table 4).

In addition to chemical fertilizer, animal manure is also used in the enterprises. Animal manure was used by 40% of the enterprises (Table 4). Some of the enterprises used the manure obtained from the animals they raised and some of them used it by purchasing. The fertiliser they used was sheep and cattle manure.

Demirtaş [5] found that 63% of the farms producing apricot in Mersin province used animal manure. Uçar [21] determined that 22.41 kg of animal manure was used per tree in Malatya province. Çatı [2] determined that farms producing organic apricot in Malatya province use only animal manure due to the breeding system.

The 60.14% of the enterprises had soil analysis. 47.62% of the farms in the first stratum, 56.36% in the second stratum and 67.74% in the third stratum had soil analysis (Table 4).

Demirtaş [5] determined that 13.6% of the apricot farms in Mersin province had soil analyses. However, 86.4% of the farms decided on fertilisation according to personal experience and recommendations without soil analysis. Fidan [7] found the same situation in apricot farms in Iğdır province.

As a result of the interviews with the enterprises, it was determined that the apricot planted areas of the farms were irrigable land and there was no non-irrigable land. It was determined that the enterprises irrigated an average of 9.91 times during the apricot production period. It was determined that the regional average was 9.85 times irrigation. According to the enterprise groups, it was calculated that the farms in the first layer irrigated 9.86 times, in the second layer 9.80 times and in the third layer 10.03 times (Table 4).

Demirtaş [5] found that 48.1% of the farms producing apricot in Mersin province irrigated 8-10 times and 24.6% irrigated more than 8-10 times. Fidan [7] found that apricot farms in Iğdır province irrigated between 5 and 15 times in a production period. Uçar [21] determined the number of irrigations as 6 times in farms producing apricot in Malatya province. The number of irrigations in the research area is similar to the number of irrigations determined in other studies.

In apricot cultivation, drip irrigation, bowl irrigation, pan irrigation and sprinkler irrigation systems can be used. With drip irrigation method; it provides irrigation of large areas with little water where water is scarce. In the irrigation of apricot orchards, 98.55% of the farms used drip irrigation system. 1.45% of the farms prefer furrow irrigation system. All of the farms in the first and third stratum use drip irrigation system. In the second stratum, 96.36% of the farms prefer drip irrigation system and 3.46% prefer furrow irrigation system. Therefore, the majority of the farms use drip irrigation system. This shows that education and extension activities are effective in the research region and the level of awareness of the producers on the correct use of water is quite high.

The most important apricot diseases and pests in the investigated farms are flower monilias (*Monilinia laxa*), fruit monilias (*Monilinia fructigena*), leaf borer/rust (*Wilsonomyces carpophilus*), sapling dipworm (*Capnodis tenebrionis*), black spot, powdery mildew (*Sphaerotheca pannosa*), plum kohl/shell weevil (*Sphaerolecanium prunastri*) Armillaria root rot (*Armillaria mellea*), monkey worm (*Otiorhynchus spp.*), red spider (*Tetrancyhus spp.*), internal worm, rootworm and pig.

It was determined that 15.22% of the farms examined fought against monilia, 14.49% against black spot, 13.04% against leaf borer and monkeyworm, 11.59% against borer, 10.87% against red spider, 7.25% against crustacean, 6.52% against pig, 4.35% against root rot and 3.62% against gumming.

The amount of spraying applied by the farms in the research region against apricot diseases and pests in a production season was found to be 8 on average. Within the apricot planted area width groups, the number of chemical pesticide use in a season varied between 6.24

and 9.26. In the average of the region, 7.12 spraying operations were performed. The farms in the first stratum sprayed 6.24 times, 7.25 times in the second stratum and 9.26 times in the third stratum (Table 4). It was found that there was a parallel increase between apricot planted area width and chemical spraying. In all farms, Bordeaux slurry was applied and fungicides, insecticides and acaricides were used. Spraying started in February and continued until June. According to Özen and Gül [16], agrochemicals were used 4.97 times a year in the region of Mersin to produce apricots.

Pruning is done to ensure that fruit trees form a more uniform and strong crown and remain in the productive age for many years, and to strengthen the trees that have begun to weaken and to obtain yield for a while longer. The farms examined generally start pruning by giving special shape from the age of 3 and do it regularly every year. The pruning process starts when the trees shed their leaves. Pruning is done by using a ladder since the trees are classical trees, which increases the use of labour.

Since not all apricot fruits ripen on the tree at the same time, harvesting is done gradually in apricot gardens. According to the findings obtained from the farms examined, it was determined that 42.75% of the producers decided the harvest time according to colouring, 20.29% according to ripeness, 0.72% according to market conditions and 36.24% by considering all the criteria mentioned above. Harvest time starts in June and continues in September for new varieties.

After the apricot harvest, the collected fruits are made ready for sale in wooden and plastic packages for sale. 87.69% of the enterprises used plastic crates, 2.17% used wooden crates and 10.14% used both types of crates.

It was stated that 95.65% of the farms had product loss during harvesting or transport. The rate of product loss was 95.24% in the first layer, 94.55% in the second layer and 96.77% in the third layer.

It was determined that the average of the producers who responded to the product loss rate as 1% was 26.81%, those who responded as 2% was 34.78%, those who responded as 3% was 23.19%, those who responded as 4% was 3.62% and those who responded as 5% was 5.80%.

In the apricot marketing channels in the research region, 55.07% of the farms sold their products to brokers. The rate of sales through wholesaler+trader channel was 31.16%. The rate of sales to brokers coming from outside the district was found as 13.77%. Due to the short shelf life of apricot, the producer wants to sell apricot as soon as possible. In this case, he/she prefers the most attractive sales method for him/herself.

Demirtaş [5] determined the method of apricot sales in Mersin province as 69.1% of the farms to the trader, 28.4% to the broker and 2.5% to the consumer. Özen and Gül [16] determined that 13.1% of the farms sold apricots to traders, 74.7% to brokers, 5.4% to traders from outside the province and 5.4% to direct consumers in Mersin province. Fidan [7] determined that 56.92% of the apricot sales of apricot producing farms in Iğdır province were to traders, 30.77% to brokers and 12.31% to consumers. Uçar [21] determined that apricot farms producing apricots in Malatya province sold dried apricots to traders by 38.99%, to brokers by 30.19% and to exporters by 30.82%. Çatı [2] found that 6.5% of the organic apricots were sold to traders, 87.5% to exporters and 6.5% to processors in Malatya province.

There was no broker or company to which 97.10% of the farms examined were affiliated. It was determined that 2.90 percent of the farms were affiliated to a broker or a company. The rate of dependence to a broker or firm was 4.76% in the first stratum, 1.82% in the second stratum and 3.23% in the third stratum.

In the farms examined, the producers classified the apricots they produced as first class, export product and industrial apricots and offered them for sale. The producers were making sales by mutual agreement on the amount of the product in the garden, by retail sale or by weighing the total product and making sales by kilo calculation. During the fruiting period, the proportion of sales by

kabala was 10.87 percent. It was determined that 88.41% of the farms and 0.72% of the farms realized sales by weight and retail sales, respectively. In general, producers preferred to sell apricots by weight.

The enterprises were selling to İstanbul, Ankara, İzmir, Manisa, Bursa and other provinces in the domestic market. As for the foreign market, it was reported that apricots were sold to Russia, Ukraine, Iraq, Turkmenistan and Azerbaijan.

Demirtaş [5], in his study conducted in Mersin province, determined the apricot sales method of the farms as 82.7% kilo and 17.3% kabala sale. Fidan [7] reported that 73.85% of apricot farms in Iğdır province sell apricots by kabala and 26.15% by kilo.

The operators categorized the apricots grown as table apricots in the field and offered them for sale. In the apricot classification of the farms; 57.97% buyer request, 34.06% exporting company request and 7.97% technical staff were effective. Buyer's request was effective 66.67% in the first layer, 54.55% in the second layer and 58.07% in the third layer. The most important factor in the classification stage was determined as buyer's request.

It was stated that 57.25% of the farms examined sold apricots in cash, 32.61% sold some of the apricots on credit and some in cash, 4.35% sold on credit and 5.80% sold according to the conditions. The enterprises made cash sales to a great extent. The rate of cash sales was 57.14% in the first stratum, 65.45% in the second stratum and 50.00% in the third stratum.

Demirtaş [5] determined that 92.6% of the farms in Mersin province sold apricots in cash and 7.4% of the farms sold apricots on credit. Çatı [2] determined that 17.7% of the farms sold organic apricots in cash and 82.3% sold them on credit in Malatya province.

The 2.90 percent of the farms received advance payments from traders. The rate of receiving advance payment from traders was 4.76% in the first stratum, 3.46% in the second stratum and 1.61% in the third stratum. It was determined that the farms obtained information about apricot market from other growers (31.88%), exporter companies (13.77%), media (10.87%), internet (2.17%) and chamber of agriculture and district agricultural directorate (1.45%).

It was determined that the enterprises used machinery for 1.97 hours per decare in apricot production. Family labour force was 27.57 hours per decare and foreign labour force was 27.00 hours per decare. According to the average of the region, machine use per decare was 1.90 hours, family labour use was 32.00 hours and foreign labour use was 26.92 hours (Table 4).

In the farms in the first stratum, machine use was 1.80 hours, family labour use was 41.73 hours and foreign labour use was 31.63 hours. In the second stratum, machine use was 1.86 hours, family labour 34.19 hours, foreign labour 25.51 hours. In the third stratum, machine use was 2.01 hours, family labour 25.07 hours and foreign labour 27.24 hours (Table 4).

Table 4. Technical practices of the farms in apricot cultivation

	I	II	III	FA	RA
Number of tillage	7.26	20.07	55.52	34.05	19.59
N usage per decare (kg)	8.75	8.91	8.85	8.86	8.87
P usage per decare (kg)	11.93	13.24	12.86	12.92	12.93
K usage per decare (kg)	4.21	4.87	4.18	4.33	4.54
N usage per tree (g)	268.00	294.00	236.00	248.00	268.00
P usage per tree (g)	365.00	437.00	343.00	361.00	391.00
K usage per tree (g)	129.00	161.00	112.00	121.00	137.00
Farms having soil analyses (%)	47.62	56.36	67.74	60.14	54.55
Foliar fertilizers usage (%)	66.67	76.74	82.50	78.99	73.81
Manure usage (%)	20.00	30.23	48.75	39.86	28.72
Number of irrigation (times)	9.86	9.80	10.03	9.91	9.85
Number of chemical spraying (times)	6.24	7.25	9.26	8.00	7.12
Family labour used per decare (hour)	46.12	35.22	28.09	33.68	38.29
Foreign labour used per decare (hour)	27.41	25.49	25.00	25.56	26.12
Total labour used per decare (hour)	73.53	60.71	53.09	59.23	64.41
Machinery power used per decare (hour)	1.90	1.84	2.04	1.94	1.89

Source: Own calculation.

Demirtaş [5] found that apricot farms in Mersin province used 49.20 hours of labour and 6.01 hours of traction power per decare in

apricot production. According to Özen and Gül's [16] estimation, 37.20 hours of labour were required for the apricot production in Mersin. Using data from 1998, Demirtaş and Gül [6] estimated that 49.20 hours of labour were used per decare in the province of Mersin. Fidan [7] estimated that 33.85 hours of labour and 2.80 hours of machinery power were used per decare in apricot production in Iğdır province.

The Future of Apricot in the Enterprises Investigated in the Research Area

Among the farms in the study region, 49.28% of the farms learnt apricot cultivation from their families, 48.55% learnt it on their own and 2.17% learnt it through education. Apricot cultivation, which started in 1989 and continues today, has been one of the important sources of livelihood in the study region.

The 47.83% of the farms preferred apricot cultivation because it is suitable for the climate of the region. Apricot cultivation was preferred by 18.12% of the farms due to having a job, 14.49% due to providing additional income, 8.70% due to the low cost of apricot production, 6.52% due to being a family cultivation, 4.35% due to the good return. The fact that the climate of the region was suitable for apricot cultivation was the leading factor for the farms to cultivate apricot.

The majority of the farms (99.28%) were engaged in classical apricot cultivation. It was determined that the enterprises were not dependent on any person or company in contracted production in apricot cultivation.

A very low proportion (0.72%) of the enterprises reported that they had private consultants for apricot orchard maintenance, disease and pest control. While the farms in the first and second stratum did not have a private consultant, the farms in the third stratum had a private consultant.

The 2.17% of the farms had organic product certificate in apricot cultivation. As the scale of the enterprise increased, the rate of organic product certificate ownership increased.

The 93.48% of the farms examined stated that they were satisfied with apricot cultivation, 3.62% were very satisfied, 1.45% were not satisfied, 0.72% were moderately or not satisfied at all. It was determined that the satisfaction level of the farms increased as the planted area increased.

Apricot and apple production are the most important agricultural production branches in the region. When farmers were asked about the most profitable production branch, 99.28% of the farms reported apricot cultivation and 0.72% reported apple cultivation. 30.43% of the farms stated that apricot production is more profitable due to its high return, 21.01% due to the short harvest period, 18.84% due to the high yield, 15.94% due to the lower cost compared to apple production cost, and 13.77% due to the different yield periods of the varieties.

The geographical conditions and climate of Isparta province enable the cultivation of more than one fruit. Some farms have started to establish apricot gardens instead of apple gardens due to the reasons such as lower input costs in apricot production compared to apple cultivation, shorter harvest time, better price compared to apples, and receiving the product price in a shorter time.

The farms in the research region stated that the most suitable apricot variety for cultivation in their region is Şekerpare (42.03%). Other apricot varieties are Roxsana, Aprikoz (shalak), Orange Ruby, Alyanak and Oscar.

While 78.99% of the farms are satisfied with the apricot variety they grow, 9.42% are not satisfied and 11.59% are partially satisfied. It was determined that 66.67% of the farms in the first layer, 81.82% of the farms in the second layer and 80.65% of the farms in the third layer were satisfied with the apricot variety they grew. The farms that were partially satisfied and dissatisfied with the apricot varieties they cultivated stated that they would change the apricot varieties in general.

It was determined that 11.59% of the farms examined had agricultural insurance for apricot. According to the planted area width, 4.76% of the farms in the first stratum, 5.45% in the second stratum and 19.35% in the third

stratum had agricultural insurance. It was found that the rate of farms having agricultural insurance for apricot increased as the scale of the enterprise increased.

The reasons for not having agricultural insurance were deemed unnecessary, distrust in experts, high fees and small size of planted land.

Weaknesses and strengths of enterprises

The 18.84% of the farms stated that there is no market in their region, 18.12% stated that there is insufficient government support, 13.77% stated that there is lack of information in cultivation, 13.04% stated that there is no processing facilities, 12.32% stated that there is lack of storage system, 11.59% stated that there is insufficient consultant services, 9.42% stated that producers cannot determine the price, 2.90% stated that there is no co-operation as the weaknesses of apricot production. According to Şirikçi and Gül [18], the use of agricultural subsidies by farmers has a beneficial impact on the profitability indices of fruit production.

Farms stated that they could not receive sufficient counselling services from provincial/district directorates. For this reason, it was stated that the information deficiencies in apricot cultivation were not eliminated. The fact that apricot prices are determined by buyers, brokers, traders and exporters rather than producers, lack of cooperatives, inability to store the harvested product, lack of processing facilities and loss of product were identified as weaknesses in apricot production.

The 21.02% of the farms stated that the climate is suitable, 18.12% stated that the land conditions are suitable, 15.94% stated that the soil is fertile, 13.04% stated that apricot cultivation is easier than apple cultivation, which is another product grown significantly in the region, 10.87% stated that the yield is high and the production period is suitable for sale, 10.14% stated that it prevents rural-urban migration as the strengths of apricot production in the region.

The climate, soil structure and land condition of the region where the farms are located are very suitable for apricot cultivation. These favourable features provide high yields in production if frost does not occur and other conditions are met. The fact that the young population makes a living with apricot cultivation prevents migration from rural to urban areas and reduces the demand for foreign labour to a certain extent.

Opportunities and threats foreseen by the enterprises

Of the farms examined, 26.09% of the farms expressed the following criteria as the opportunities they foresee in apricot production in the region: 26.09% for new business opportunities, 24.64% for branding, 21.01% for having a say in exports, 14.49% for increasing the local market share, 13.77% for increasing the promotion of the region. The enterprises thought that apricot cultivation could provide job opportunities in areas such as processing, storage, packaging, case production, sapling cultivation. Increasing the market share through branding in foreign and domestic markets and increasing the promotion of the region with the sales made were among the foreseen opportunities.

Late spring frosts (29.71%), diseases and pests (27.54%), irrigation shortage (17.39%), drought (17.39%), decrease in apricot price (11.59%), failure of new varieties (8.70%), decrease in yield (5.07%) were the threats foreseen by the farms in apricot production.

Apricot price varies according to the supply-demand situation. Although apricot prices have been at or close to the level desired by the producers for the last few years, apricot production will be adversely affected in case of a decrease in prices. Producers see it as a threat that the new varieties they offer to the domestic and foreign market are not preferred. Late spring frosts, diseases and pests, irrigation shortage and the possibility of a decrease in yield due to drought are perceived as other threat factors.

The thoughts of the enterprises about the future in apricot cultivation

The 2.17% of the apricot farms stated that they would completely quit apricot cultivation in the future, 1.45% stated that they would reduce the planted area, 32.61% stated that

they would not change it and 63.77% stated that they would expand their planted areas. The farms that thought that they would give up completely were 4.76 percent in the first stratum and 3.64 percent in the second stratum. In the third stratum, there is no idea of quitting apricot cultivation. It was determined that the rate of giving up cultivation decreased as the scale of the enterprise increased. There were no farms in the first stratum, 1.82% in the second stratum and 1.61% in the third stratum. The rate of those who thought that they would not change was 52.38% in the first stratum, 36.36% in the second stratum and 22.58% in the third stratum. The tendency to increase was 42.86% in the first layer, 58.18% in the second layer and 75.81% in the third layer. It was determined that the number of farms willing to expand the planted area increased as the scale of the enterprise increased.

The 47.83% of the farms tend to change the rootstock used in apricot cultivation. It was determined that 23.81% of the farms in the first layer tended to change the rootstock used in apricot cultivation, 40.00% of the farms in the second layer and 62.90% of the farms in the third layer tended to change the rootstock used in apricot cultivation. It was determined that the idea of changing the rootstock increased as the scale of the enterprise increased.

The 66.67% of the farms tended to make changes in the apricot varieties they had already grown. 33.33% of the farms in the first stratum tended to change the apricot varieties they had already grown, 56.36% of the farms in the second stratum and 87.10% of the farms in the third stratum tended to change the apricot varieties they had already grown. It was found that the idea of changing varieties increased as the scale of the enterprise increased. The enterprises were in search of growing apricot varieties that were less affected by late spring frosts, had high yields and had good yields instead of trees with low yield levels or trees that had completed their economic life.

The idea of making changes in marketing was investigated in the analyzed farms. 78.99% of the enterprises stated that they would like to sell their products to the market in case of the establishment of a market. The thought of the enterprises to sell their products to the market was determined as 80.95% in the first layer, 74.55% in the second layer and 82.26% in the third layer. The rate of farms that answered that they would sell according to market conditions was 21.01%. Among the farms, 19.05% of those in the first stratum, 25.45% of those in the second stratum and 17.74% of those in the third stratum stated that they would sell according to market conditions. In quince farming, Şirikçi and Gül [19] discovered a favourable correlation between relative profitability and the marketing structure variable. The same condition, it might be said, applies to the production of apricots.

The 7.25% of the farms have a tendency to change the apricot production technique. In the first stratum, there are no farms with a tendency to change apricot production technique. In the second stratum, 3.64% of the farms and 12.90% of the farms in the third stratum had the tendency to change the apricot production technique. It was observed that the tendency to change the production technique increased as the scale of the enterprise increased. Those who wanted to change the production technique stated that they wanted to grow apricots with modern or organic production technique.

16.67% of the farms analyzed had the tendency to make changes in the irrigation system. The tendency to change the irrigation system was 4.76% in the first stratum, 14.55% in the second stratum and 22.58% in the third stratum. It was determined that the thought of making changes in the irrigation system increased as the planted area width increased. The farms that wanted to make changes in the irrigation system were in favour of irrigation by drilling.

The 76.09% of the farms stated that they would make changes in the fertilization applied in apricot cultivation according to the fertilizer prices and the guidance of the drug dealer. On the other hand, 23.91% of the farms stated that even if the fertilizer prices

increased, they would continue the fertilization process by considering their own knowledge and experience in order to avoid a decrease in product yield and quality.

The 82.61% of the analyzed farms stated that they would make changes in spraying according to the prices of pesticides, the guidance of the pesticide dealer and the condition of diseases and pests.

The idea of the farms to make changes in labour use was also investigated. 10.14% of the farms stated that they would not change the use of labour and 89.86% stated that they might change. It was stated that foreign labour would be needed depending on the increase in yield. As the scale of the enterprise increased, the idea of not making changes decreased. The opinion of making changes in the use of labour force was determined as 66.67% in the first stratum, 87.27% in the second stratum and 95.16% in the third stratum. As the scale of the enterprise increased, the idea of making changes in labour force also increased. Enterprises have to make use of foreign labour force in case of an increase in product yield depending on the size of the planted area.

The 17.39% of the analyzed farms have the idea of making changes in machinery-equipment. The farms that want to make changes in the machinery-equipment assets are considering to have tractors, spraying machines and other agricultural mechanization tools or to renew them within the possibility.

In general, it was determined that the producers will continue apricot cultivation. It was determined that 63.77% of the producers would expand. In the apricot varieties that the enterprises have already grown, 66.67% of the producers think of changing the variety. It was determined that 78.99% of the farms were planning to make changes in the marketing phase. 47.83% of apricot growers have the idea of changing rootstock. The majority of the producers (92.75%) do not think to change the production technique. 16.67% of the farms have the idea of making changes in irrigation system. According to the findings obtained, 76.09% of the farms stated that they would make changes in fertilization according to fertilizer prices and the guidance of the drug dealer. 82.61% of the farms stated that they would make changes in spraying according to the prices of pesticides, the guidance of the pesticide dealer and the condition of diseases and pests. 17.39% of the farms would not make changes in spraying. It was found that 10.14% of the enterprises would not make changes in the labour force and 89.86% would make changes.

Isparta province ranked eighth in apricot production in Turkey in 2020 and ranked fifth in 2021 with the increase in yield and production. In the light of all the findings obtained, it was determined that apricot yield increased in the research region. It was determined that producers will expand in the coming years and there will be an increase in production and yield. The fact that the enterprises prefer drip irrigation method shows that their level of awareness is high and reflects that they will show the necessary importance and sensitivity to water use in order to avoid problems in production in the coming years. Eliminating the lack of counselling services in the region will prevent wrong practices in production.

Table 5. Farms' views on the future of apricot cultivation

	I	II	III	FA	RA
Proportion of farms to increase apricot cultivation area (%)	42.86	58.18	75.81	63.77	54.74
Proportion of farms to reduce apricot cultivation area (%)	4.76	3.64	0.00	2.17	3.62
Proportion of farms that will reduce apricot cultivation (%)	0.00	1.82	1.61	1.45	1.15
Farms considering to change rootstock in apricots (%)	23.81	40.00	62.90	47.83	36.86
Those who have the idea of changing the apricot variety of the farms (%)	33.33	56.36	87.10	66.67	51.68
Those who have the idea of making changes in the apricot production technique of the farms (%)	0.00	3.64	12.90	7.25	3.41
Those who have the idea of making changes in the irrigation system of the farms (%)	4.76	14.55	22.58	16.67	11.98
The farms' intention to make changes in machinery-equipment assets (%)	33.33	18.18	11.29	17.39	22.80
Farms' intention to change labour use (%)	66.67	87.27	95.16	89.86	80.82

Source: Own calculation.

CONCLUSIONS

In this study, some social indicators and technical practices of apricot cultivation in Isparta province were evaluated. In addition, farmers' predictions about apricot cultivation in the future periods were determined.

In the research area, there is a tendency of farms to continue apricot cultivation. As a matter of fact, it was determined that 63.77% of the farms would expand their apricot planted areas. There may be future changes in apricot varieties and rootstocks. In terms of the development of apricot cultivation in the region, the fact that most of the farms prefer to produce late or early varieties will create a surplus in apricot supply. In cases such as low seasonal demand and shortage of sales, it will cause the producer to sell the product at very low prices. Therefore, the fact that the producers in the research region do not concentrate on a certain variety will prevent the negativity that may be experienced in the future. In the region, land fragmentation was high and small scale was dominant. The awareness that natural resources are not unlimited in the region should be increased and measures should be taken to protect the soil and water. The fact that the farms preferred drip irrigation method showed that their level of awareness was high. On the other hand, it was observed that climate changes have been effective in the region especially in recent years. At this point, more sensitivity should be shown to the use of water in order to avoid problems in apricot production in the coming years.

Fruit cultivation is an agricultural endeavour covering long years. The selection of the place where the orchard will be established, the procedures in the establishment process, production and marketing process are very important. In order to increase the efficiency of fertilization in apricot cultivation, soil analysis should be given enough importance. For this reason, producers should have sufficient knowledge about the factors that are effective in the production cycle such as choosing the place where the garden will be established, the rootstocks to be used, the apricot variety to be grown, the control of diseases and pests, soil tillage, pruning, irrigation, harvesting, spraying and fertilization. In order to prevent producers from making wrong choices and practices, consultancy services should be increased and extended by institutions and organizations related to the agricultural sector. In addition, apricot producers should be encouraged to organize themselves in order to be more effective in the price formation and sales of their products.

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REFERENCES

[1]Akpınar, G., Gül, M., Dağıstan, E., 2006, Development and Structure of Fruit Trade in Turkey during the EU Accession Process (in Turkish). 7th Turkish Agricultural Economics Congress, page: 836-848, Antalya.

[2]Çatı, E., 2019, Socio-economic characteristics of organic apricots production farms in Malatya (in Turkish). MSc. Thesis, Çukurova University, 117p., Adana.

[3]Çukur, F., Saner, G., Çukur, T., Uçar, K., 2008, The evaluation of apricot farmers' behaviours toward agricultural insurance for risk transfer in Malatya province: the case study of Doğanşehir district, Polatdere village (in Turkish). Journal of Ege University Faculty of Agriculture 45(2):191–198.

[4]Dellal, İ., Koç, A., 2003, An econometric analysis of apricot supply and export demand in Turkey. Turkish Journal of Agriculture and Forestry, 27:313–321.

[5]Demirtaş, B., 2000, Apricot production economics in İçel province (in Turkish). MSc. Thesis, Çukurova University, 107p., Adana.

[6]Demirtaş, B., Gül, A., 2003, Socio-economic structure and problems of fresh apricot producers in Mersin province (in Turkish). Journal of Aegean Agricultural Research Institute, 13(1): 158-175.

[7]Fidan, İ., 2009, Economic analyses of apricot production in Iğdir province (in Turkish). MSc. Thesis, Atatürk University, 74p., Erzurum.

[8]Gül, M., 1998, Production cost and producer problems of maize in irrigated areas of Yüreğir province (in Turkish). MSc. Thesis, Çukurova University, 118p., Adana.

[9]Gül, M., 2005, Economic analysis of apple farming in the trans-Taurus mountains region (in Turkish). PhD. Thesis, Çukurova University, 405p., Adana.
[10]Gül, M., Akpinar, M.G., 2006, An assessment of developments in fruit production in the World and Türkiye (in Turkish). Mediterranean Agricultural Sciences, 19(1): 15-27.
[11]Gül, M., Özen, M., 2019, The effect of agricultural credit usage on the socio-economic indicators of apricot farmers: A case of Mut district of Mersin in Türkiye. International Journal of Agriculture Forestry and Life Sciences, 3(2): 259-263.
[12]Gündoğmuş, E.A., 2003, Comparative analysis of organic and conventional dried apricot production on small households in Turkey. Asian Journal of Plant Sciences, 5(1): 98–104.
[13]Gündüz, O., Ceyhan, V., Esengun, K., 2011, Measuring the technical and economic efficiencies of the dry apricot farms. Journal of Food, Agriculture e & Environment, 9(1):319–324.
[14]Mesci, O., Karlı, B., 2018, Socio-economic analysis of farms in the area of land consolidation in Isparta province (in Turkish). Mustafa Kemal Üniversitesi Ziraat Fakültesi Dergisi, 23 (1): 106-114 .
[15]Olgun, A., Adanacıoğlu, H., 2006, Production and marketing of organic dried and the tendences of apricot producers for the future in Turkey: case study of Malatya. Acta Horticulturae, 717:271–280.
[16]Özen, M., Gül, M., 2020, Marketing structure of apricot production and analysis of its problems: A case of Mut district in Mersin province. International Journal of Agriculture Forestry and Life Sciences, 4(1): 79-86.
[17]Sarıbaş, E. B., 2012, Economic analysis of Turkish apricot industry: A case study on Malatya province (in Turkish). MSc. Thesis, İstanbul University, 103p., İstanbul.
[18]Şirikçi B. S., Gül, M., 2019, Economic structure of quince farms in Turkey. Erwerbs-Obstbau, 61: 237-244.
[19]Şirikçi, B.S., Gül, M., 2021, Determination of effective factors and profitability on quince farmers in Turkey. Custos e Agronegocio on Line, 17 (2): 310-325.
[20]TURKSTAT, 2022, Turkish Statistical Institute, Agriculture database. https://biruni.tuik.gov.tr/medas/?kn=92&locale=tr, Accessed on 01.04.2022.
[21]Uçar, K., 2017, A research on analysis of investment decisions of apricot growers and risk evaluation in Malatya province (in Turkish). PhD. Thesis, Ege University, 169p., İzmir.
[22]Uçar, K., Engindeniz, S., 2021, A profitability analysis of investment of apricot growing in Turkey. Erwerbs-Obstbau 63: 75–80.
[23]Uçar, K., Saner, G., 2013, Analysis of investment projects oriented to organic and conventional apricot orchard in Malatya Province (in Turkish). Ege Üniversitesi Ziraat Fakültesi Dergisi, 50(2):191–198.