



Problems Encountered in Organic Almond Farming: The case of Dicle and Eğil Districts

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Abstract: Hard-shelled fruits including almonds have a special place in healthy eating due to their richest nutritional content. Diyarbakır province has some 3.9 per cent of total almond tree asset of Turkey. Dicle and Eğil districts that selected as the study area have some 13.8 per cent of almond tree asset of Diyarbakır province. For the diffusion of organic almond farming, almond farmers in these districts have been supported by various institutions since the year 2011. The problems encountered in organic almond farming in these districts were examined in a field study. It was determined that almond worm was the most important cause of the economic losses. Moreover, the difficulties in access to labour was the most important restriction limiting organic almond production.

Keywords: Almond farmers, farming problems, organic farming

Organik Badem Yetiştiriciliğinde Karşılaşılan Sorunlar; Dicle ve Eğil Örneği

Öz: Sert kabuklu meyvelerin, özellikle de bademin besin madde içeriğinin oldukça zengin olması nedeniyle sağlıklı beslenmede oldukça önemli bir yeri vardır. Diyarbakır'ın badem ağacı varlığı Türkiye'nin badem ağacı varlığının %3.9'unu oluşturmaktadır. Çalışma alanı olarak seçilen Dicle ve Eğil ilçesi ise Diyarbakır badem ağacı varlığının %13.8 oluşturmaktadır. Organik badem yetiştiriciliğinin yaygınlaştırılması amacıyla 2011 yılından itibaren bu ilçelerde çeşitli kurumlarca desteklemeler yapılmaktadır. Çalışmada bu ilçelerdeki organik badem yetiştiriciliğinde karşılaşılan problemler saha çalışması yapılarak incelenmiştir. Meyve iç kurduunun ekonomik kayıp verediren en önemli sorunun olduğu görülmüştür. Ayrıca organik badem yetiştiriciliğini en fazla sınırlayan faktörün işçi bulmak olduğu tespit edilmiştir.

Anahtar Kelimeler: Badem üreticileri, Organik tarım, Sorunlar

1. Introduction

Almond has the feature of balancing farm income due to its marketability at green, unripe and fully developed stages in a production year. It also provides an important advantage to the producers as it is not affected by seasonal price fluctuations, since the storage conditions are more suitable than other fruits.

Originating from the hilly regions of Central Asia, this crop has later spread in the Mediterranean basin. However, it is also noteworthy that almond shells from 7000 BC found in archaeological excavations executed in the South-eastern Anatolia proved that Turkey is also one of the gene centres of almonds (Sykes, 1975).

The fact that almond is not a selective regarding soil requirements, its hardness to drought makes it possible to grow in rocky, stony, and calcareous soils. Almond is not selective regarding soil requirements (Atlı et al. 2011). Even though it is predominantly cultivated in the Mediterranean, Aegean and Marmara regions, it can be economically grown in all regions of Turkey except the Black Sea region (Özbek, 1971).

All hard-shelled fruits are always marketed at high prices in world markets. For this reason, especially the USA, the European countries having a coast to Mediterranean Sea such as Spain, Italy, Greece and, to a lesser extent, France, and the North African countries such as

Morocco and Tunisia have attached great importance to these fruits (Kaşka et al. 1999).

Despite Turkey has rich almond gene resources; only some of the almond production is made with developed varieties as the rest is realized through seedling trees. Except Mediterranean and Aegean regions almond production is not carried out in single-cultivar almond orchards in Turkey.

Since the European countries and the USA have started to improve almond varieties and agronomic techniques long before, they have not only solve the problems in almond production, but also have increased the yield, and so they have become arbiter in world markets. Although Turkey has more advantages in almond production in terms of climate and soil properties, it ranks seventh in the world in almond production (FAOSTAT, 2017). Almond yield in Turkey greatly varies from region to region. For example, it is about 10 kg per tree in Diyarbakır province as it is 26 kg per tree in Mersin province. The magnitude of the economic loss due to yield unevenness throughout the country is striking.

Southeastern Anatolia Region meets approximately 22% of Turkey total almond production. and ranks third in shelled almond production as almond trees asset in Diyarbakır constitutes 3.9% of the country total (TÜİK, 2019). The most important reason for the low yield is the cultivation method of almond, e.g. almond is not cultivated in single variety almond orchards rather it is cultivated as a fence tree, which in turn causes worse agronomic conditions, and the use of seedlings from seeds instead of certified saplings of high-yielding varieties adapted to the region are among the reasons for the low yield.

Along with the increasing food demand due to the population growth, developing level of knowledge and culture have resulted in new sensitivities on the satisfaction of people's food needs. As a result, organic products and therefore organic agriculture have entered the agenda to meet the healthy food demand worldwide.

Organic agriculture in Turkey started in the 1980s with some specific products and later expanded the product range. Again, organic

farming has been supported with some schemes to meet the expanded demand in time. Almonds along with other hard-shelled fruits have also taken part in this new production system (Aksoy and Altındışli, 1999).

International Fund for Agricultural Development (IFAD) of United Nations has supported almond producers in Dicle and Eğil districts in Turkey in 2011. These districts of Diyarbakır province are characterised with relatively undulated and mountainous geography resulting in small-sized and fragmented farms. Seventy per cent of the supports provided for the establishment of almond orchards was granted and supported minimum and maximum sizes of almond orchards were 0.5 and 6.5 hectare, respectively.

Simultaneously with the IFAD grants for the establishment of the almond orchards, organic products support and ÇATAK (Environmentally Based Agricultural Land Protection Scheme) support have started to be given and have still been ongoing.

In cooperation with GAP (South-eastern Anatolia Development Project) Administration, Diyarbakır Governorate and Provincial Directorate of Agriculture, were established the Dicle Organic Fruit Producers Association and Eğil Organic Grain Producers Association in late 2012 and 2013, respectively. Producers have been supported through these associations. In this study, it was aimed to reveal the problems of the producers who started to grow almonds first and then continue with organic almonds in both districts.

2. Materials and Methods

2. 1. Material

Sampling frame for the study encompasses all almond producers granted by IFAD in Dicle and Eğil districts. Study was conducted in two phases. The conceptual framework was established through literature review in the first phase, and then in the second phases hypotheses were set out and accordingly, data were collected with the field study. Data were collected using structured questionnaires and complete enumeration-based approach in February 2019.

Since the data of the study were collected through a questionnaire study, it was determined that the study was not against the ethical rules with the decision of the Dicle University Science Ethics Committee 970858074-045.99-. All 52 almond producers in both districts, who established almond orchards using IFAD grants, were face to face interviewed (Gökçe, 1988). In addition to the structured questionnaires semi-structured interviewing method was also used in data collection for qualitative data. Qualitative research deals with process more than products or outputs (Yılmaz ve Altinkurt, 2011). Semi-structured interviews are frequently preferred by researchers due to their certain level of standard and flexibility. These interviews eliminate the limitations in questionnaires based on writing and filling and help gain in-depth information on a particular subject (Yıldırım ve Şimşek, 2005). Semi-structured interviews are neither as rigid as fully structured ones, nor as flexible as unstructured interviews. They are between the two ends. Semi-structured interview technique was used because it provides such flexibility to researchers. In analysis of the quantitative data descriptive statistics were used. Answers to all questions were analysed according to percentage and frequency values. Analyses were performed through SPSS 17 software.

2.2. Data Analysis

In analysis of the data descriptive statistical methods were used as qualitative data were analysed with chi-square test. Moreover, consistency analysis was performed for the ordinal data obtained according to Likert scale. For the consistency analysis Cronbach's alpha statistics was calculated for the measure of reliability or internal consistency of the ordinal variables collected with the questionnaires. As it varies between 0 and 1 the values, above 0.70 is considered to be acceptable and above 0.8 indicates the highly reliability of the ordinal variables (Tavakol and Dennick, 2011).

In order to increase the reliability of the survey, four questions decreasing the reliability of the test were excluded and the alpha value of 0.785 was calculated for the rest of the ordinal

questions of the survey, which proves the reliability of the ordinal data in this study (Tavakol and Dennick 2011).

3. Results and Discussions

The data collected from 52 almond farmers, of which 29 from Dicle and 23 from Eğin districts were evaluated and the results were given below. The average age of the respondents was 53.4 years. Of all respondents 63.5, 11.5 and 9.5 per cent had primary school, secondary school and high school degrees respectively as the rest had no degree (1.9% were literate and 1.9% were illiterate). According to Taluğ (1975) there is a positive and significant correlation between education level and adoption of the innovations. The overall farming experience of the respondents was found to be 24.3 years as their almond farming experience was about 6.4 years. Ertek et al. (2016) reported that farm experience had a negative effect on the cooperative membership. It was found that all study respondents were the members of The Organic Grain Producers Association, which was established in Eğin district with the cooperation of GAP Regional Development Administration, Diyarbakır Governorate and Diyarbakır Provincial Directorate of Agriculture in 2013. It was also found that about 55 per cent of the respondents had no off-farm income.

It was revealed that about 38 and 10 percent of the respondents attended training programmes on almond farming and organic almond farming, respectively. Than (2011) reported that training and experience had significant effect on increasing rice yield in Myanmar. So, encouraging the farmers to attend formal education and conducting training activities should be in priority list. All study respondents were benefited from IFAD supports, of whom 44 percent received certified sapling and ÇATAK supports as 85 percent utilized organic agriculture supports.

About 54 percent of the respondents stated that they were willing to continue almond farming but around 52 percent were not willing for organic almond production (Table 1). Unwillingness for organic production might be

due to the problems accounted during organic production process. Thus, semi-structured interviewing of the respondents revealed that almond farmers were in the opinion that organic farming caused low yield due to the rules against pesticides and chemical fertilizers. When examined the adequacy of the respondents in organic almond farming by district, it was observed that the producers in both districts were

in the opinion that they had a sufficient level of knowledge on the subject (Table 2). The difference between two districts was insignificant ($p>0.1$). When questioned, majority of the respondents in both district favoured the thesis that associations had to take responsibility in organic almond farming training. The differences between the districts was not significant (Table 2).

Table 1. Willingness of the farmers to continue conventional and organic almond farming

Çizelge 1. Çiftçilerin geleneksel ve organik badem yetiştiriciliğine devam etme istekleri

Conventional almond farming			Organic almond farming		
Willingness	Number	%	Willingness	Number	%
Willing	28	53.8	Willing	13	25.0
Indecisive	15	28.8	Indecisive	12	23.3
Unwilling	9	17.4	Unwilling	27	51.9
Total	52	100.0	Total	52	100.0

Table 2. Opinions of the respondents on their knowledge levels on organic almond farming by study districts

Çizelge 2. Araştırma bölgelerine göre katılımcıların organik badem yetiştiriciliği konusundaki bilgi düzeylerine ilişkin görüşleri

	Study Districts				Total	
	Dicle		Eğil		Number	%
Knowledge Level	Number	%	Number	%		
Sufficient	8	27.6	11	48.0	19	36.5
Insufficient	21	72.4	12	52.1	33	63.5
Total	29	100.0	23	100.0	52	100.0
$\chi^2= 2,266 \quad P>0.1$						

When examined and prioritised the problems that organic almond farmers faced, it was found that lack of labour was the top priority problem. During the semi-structured interviews of the respondents they stated that they had difficulties in access to sufficient labour since most of the

young people were in seek of jobs in other sectors due to their unwillingness in doing agriculture. The second priority problem was found that respondents had lack of knowledge on organic farming, which was followed by the pest problem, ranking the third priority (Table 3).

Table 3. Problems encountered during organic almond production

Çizelge 3. Organik badem üretiminde karşılaşılan sorunlar

Farmer Problems	Number	Min.	Max.	Sum	Mean
Difficulties in access to labour	52	1.0	5.0	191	3.6
Lack of knowledge on organic farming	52	1.0	5.0	186	3.5
Pests	52	1.0	5.0	146	2.8
High deduction rates in union membership fees	52	1.0	5.0	143	2.7
High input prices	52	1.0	5.0	131	2.5
Union ineffectiveness in farmer training	52	1.0	5.0	107	2.3
Low almond prices	52	1.0	5.0	98	1.8
Inadequate supports	52	1.0	5.0	97	1.8
Low yield	52	1.0	5.0	90	1.7

Table 4. The pests causing yield losses in organic almond farming**Çizelge 4.** Organik badem yetiştiriciliğinde verim kaybına neden olan zararlılar

Almond Pests	Total Number of Study Respondents	Number of Respondents Suffered from the Pests	%
Almond fruit wasp	52	37	71
Capnodis spp.	52	13	25
Aphids	52	9	17
Almond bark beetle	52	7	13
Wood boring beetles	52	6	10
Blossom weevils	52	3	6

The most important pests causing yield losses in organic almond production are almond fruit wasp, capnodis species and aphids in respective order (Table 4).

4. Conclusions

Agricultural extension training for almond farmers should importantly be considered because the producers in both districts believe that they have lack of knowledge about organic almond farming. It is our opinion that if the training activities are given by the farmer unions, not only will it increase the "effectiveness of the training works" but, at the same time, it will activate the unions' role in organic farming since the almond farmers in both districts are agreed on that training activities should be given by the farmer unions.

Quite high percentage of those willing to continue almond farming against the considerably low percentage of those willing to continue organic almond farming may be due to farmers' unconsciousness on organic agriculture. 'Almond farming' is not an innovation for farmers, but 'organic almond farming' is an innovation. Moreover, the precondition for adopting innovations is to raise awareness among farmers. Extension works towards this direction in the research area will increase the adoption level of farmers.

As a result of the prioritisation of the farmer problems it was found that lack of labour or difficulties in access to labour is the first in ranking. This point out a macroeconomic problem rooted from the followed agricultural policies. The decrease in the employment of younger people in agriculture causes this problem. So, the results of the studies in this regard should be taken into account by the policy makers at country level.

The most important pests causing yield losses in organic almond production are almond fruit wasp, capnodis species and aphids in respective order. Organic almond producers should be helped and supported by the unions and agricultural organizations on biological control of these pests.

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