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Tekirdağ Ziraat Fakültesi Dergisi
Journal of Tekirdag Agricultural Faculty

An International Journal of all Subjects of Agriculture

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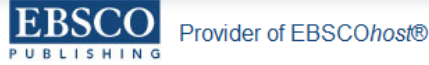
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TUBİTAK-ULAKBİM Tarım, Veteriner ve Biyoloji Bilimleri Veri Tabanı (TVBBVT) Tarafından taranmaktadır / Indexed by TUBİTAK-ULAKBİM Agriculture, Veterinary and Biological Sciences Database

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Identifying The Factors Affecting Fresh Fruit Production And Marketing in Canakkale-Turkey

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Fresh fruit production and marketing are significant in Canakkale as a consequence of suitable climate and natural conditions. The aim of this study is to identify the factors which affect fresh fruit production and marketing. In this respect, a survey has been carried out in Canakkale, and questionnaires prepared in accordance with the aim of the study have been filled out through face to face interview with 98 farmers who have been chosen by means of stratified random sampling. Product scope of this study includes apple and peach which constitute 71 % of the total fresh fruit production in Canakkale. This study has employed basic statistical methods along with Logistic Regression Analysis. Factors affecting fresh fruit production have been determined through Binary Logistic Regression Analysis whereas factors affecting fresh fruit marketing have been identified by means of Multiple Logistic Regression Analysis. As a result of this study, main problems about fruit production and marketing of the research area are farmers' education level, small and fragmented lands, lack of special supporting policy or mechanism, non-effective cooperatives, retailers, lower prices, difficulties in repayments and quality standards.

Key Words: Fruits, Production, Marketing, Regression Analysis, Turkey

Türkiye'nin Çanakkale İlinde Yaş Meyve Üretim ve Pazarlamasını Etkileyen Faktörlerin Belirlenmesi

Çanakkale ilinde, iklimin ve doğal koşulların uygun olması nedeniyle, meyve üretimi ve pazarlaması oldukça önemli bir yere sahiptir. Çalışmanın amacı, yaş meyve üretim ve pazarlamasına etki eden etmenlerin tespit edilmesidir. Bu amaçla Çanakkale ilinde bir saha araştırması yapılmış; amaca uygun hazırlanan anketler, tabakalı tesadüfi örnekleme yöntemi ile belirlenen 98 üretici ile yüz yüze görüşülerek doldurulmuştur. Araştırmanın ürün kapsamında, Çanakkale ilinde toplam yaş meyve üretiminin %71'ini oluşturan elma ve şeftali ele alınmıştır. Araştırmada yöntem olarak temel istatistik hesaplamaların yanı sıra Lojistik Regresyon Analizlerinden yararlanılmıştır. Yaş meyve üretimini etkileyen etmenler İkili Lojistik Regresyon Modeli ile, yaş meyve pazarlamasını etkileyen etmenler ise Çoklu Lojistik Regresyon Modeli ile analiz edilmiştir. Çalışmanın sonuçlarına göre meyve üretim ve pazarlaması ile ilgili ve çalışma alanında karşılaşılan temel sorunlar; çiftçilerin eğitim düzeyi, küçük ve parçalı araziler, özel destekleme politikalarının veya mekanizmalarının eksikliği, etkin olmayan kooperatifler, araçlar, düşük fiyatlar, geri ödemelerdeki güçlükler ve kalite standartlarıdır.

Anahtar Kelimeler: Meyve, Üretim, Pazarlama, Regresyon Analizi, Türkiye

Introduction

Turkey has a significant potential in terms of fresh fruit and vegetable productions as a consequence of suitable climate and natural conditions (İİB, 2014). Vegetable production value constituted nearly 27.7 % of the total agricultural production while fruit production value was about 30.0 % in 2013. Likewise, total fruit production value has been nearly 48 million \$ and total fruit marketing value has been nearly 40 million \$* in 2013. Marketed fruit value in 2013 constituted 31.2 % of the total agricultural marketing value and 29.5 %

of the total vegetable production value (TÜİK, 2014).

Canakkale is the second city (like İstanbul) which has lands in both Asia and Europe on Gallipoli Peninsula on the northwest coast of Turkey and on Biga Gallipoli, the prologtion of Anatolia. The passage climate of Black Sea and Mediterraeen climates is dominant in the city. It is more rainy in fall and less in spring. The outstanding feature of winter is severe winds coming from North. The Mediterraeen Climate is dominant during Summer and Autumn (CB, 2014).

Canakkale situated by the sea is an important province for fruit production since it has suitable climate and location. Fresh fruit production value in Canakkale constitutes 6.3 % of the total fresh fruit production value in Turkey when the average production rates of the past ten years are considered. Similarly fruit production value of Canakkale constitutes 33.8 % of the total crop production value in Canakkale while it is 23.6 % in terms of agricultural production value in Canakkale. Apple (39.1 %) and peach (32.0 %) are on the first two ranks of total fruit production value in Canakkale (TUIK 2005; 2006; 2007).

There are many studies about fresh fruit and vegetable. However, many of these studies are literature reviews and they have contained only macro-data. Only few studies have primary and original data about policies of fresh fruit production and marketing (Demirbaş, 2001; Pezikoğlu vd. 2004, Yulaf ve Cinemre 2007, Polat 2010). Due to there are few number of the study which contains original data about fresh fruit production and marketing policies, this original study is important in this context. The other important point of the study is the first study in Canakkale province in that subject.

The aim of this study is to identify factors influencing fresh fruit production in Canakkale and to offer suggestions about these problems. Data have been obtained through interviews with farmers. Product scope of this study includes apple and peach which constitute 71.0 % of fresh fruit production in Canakkale.

Material and Methods

Data in this study includes the results of the surveys. Districts in which apple and peach are produced mostly have been chosen as the research area. While determining the research area, data about production rates and production areas in the past three years have been obtained through Provincial Directorate of Food, Agriculture and Livestock in Canakkale. When the average fruit production between 2007 and 2009 are taken into account, it is seen that Bayramic comes first in terms of apple production (90.1 %) while Lapseki takes place first in peach production (72.8 %). Five villages which have larger land sizes have been found out in each district, and a total of ten villages have been chosen as the research area.

It has been found out that there are a total of 1185 enterprises, 589 of which produce apple in Bayramic county and 596 of which produce peach in Lapseki county. Extreme values like less than 0.1 ha and more than 9.0 ha are not to take into account for homogenized the sample variance so that 1158 enterprises (583 for Bayramic county and 575 for Lapseki county) take into account for sampling. Non-proportional stratified random sampling method has been employed to the counties separated since there are many large and small farms. Farm size groups given like between 1.0-2.9 ha for I. group, 3.0-5.9 ha for II. Group, 6.0 ha and more for III. Group. Neyman sampling formula is applied to the two counties separated. Thus, sample size has been identified as 98. Calculated separately for each sample volumes of the two counties as for that the share of villages total apple/peach land in the counties.

Basic statistical methods and Logistic Regression Methods, which are often used in many studies about agricultural economics, have been employed to analyze the data (Karaman, 2002; Hasdemir, 2011; Cevher et al., 2012; Everest et al., 2012; Güler and Yavuz, 2012; Gürler et al., 2012; Kaya et al., 2012). Models that have been created through Logistic Regression Method have been estimated mostly by the method of maximum likelihood estimation (Justel et al., 1994; Bircan et al., 2003; Romeu, 2003; Denuit et al., 2005; Khoshnevisan, 2006; Xu and Wang, 2012).

Whether there were differences between groups in terms of the characteristics of farmers was determined by using Chi-square analysis for intermittent variables except for farmers' age variable (Sattorra and Bentler, 2001; Bircan et al., 2003; Eymen, 2007). Logistic Regression method facilitates the analysis of the correlation between variables when dependent variable is qualitative or independent variable is qualitative and quantitative (Menard, 2002; Tranmer and Elliot, 2005; Köksal, 2011b). Logistic Regression analysis in which outcome variable is in the form of a categorical structure can be employed in three different ways. These are respectively as such: Binary Logistic Regression Analysis when dependent variable involves two choices, nominal Logistic Regression Analysis when dependent variable involves at least three choices that has nominal level of measurement, and Ordinal Logistic Regression Analysis when dependent variable involves at least three choices along with having ordinal level of measurement (Menard,

2002; Köksal, 2011a). In this study, Binary Logistic Regression and Multinomial Regression Analyses have been employed. Variables used in both regression analyses have been indicated in Table 1 and 2. Hosmer and Lemeshow test statistics have been used in order to measure variable

compliance (Hosmer and Lemeshow, 1980; Bertoloni and etc., 2000; Köksal, 2011a). Wald Analysis, which is one of the criteria measuring whether each variable is meaningful or not in the model, has also been used in this study (Engle, 1984).

Table 1: Variables affecting farmer's decision to continue production

Dependent Variable	Descriptions
Farmers planning to enlarge their orchards	1: Yes, 2: No
Independent Variables	
Farmers' age (Year)	1:23-36,2:37-47,3:48-55,4:56 and over
Farmers' education level (Year)	1: Literate and primary school graduate, 2: Intermediate school graduate, 3: High school drop out, high school graduate and college graduate
The share of fruit land in total land (%)	1:0-60,2:61 and over
Production amount (kg)	1:9.750-41.250 kg, 2:45.000-79.200 kg, 3:80.000-191.100 kg, 4: 192.000 kg and over

Table 2: Variables affecting marketing problems

Dependent Variable	Descriptions
Farmers who experience marketing problems	1: Never, 2: Always, 3: Sometimes
Independent Variables	
Farmers' age (Year)	1:23-36,2:37-47,3:48-55,4:56 and over
The share of fruit growing experience in farming experience (%)	1:0-98, 2:99 and over
Incomes from farming out (\$ /Year)	1: Yes, 2: No
Benefiting from agricultural supports	1: Yes, 2: No
The share of fruit land in total land (%)	1:0-60,2:61 and over

Results

The average amount of the agricultural land is 5.9 ha in Turkey (GTHB, 2011). Total land size is either 5.8 ha or smaller in 68.4 % of the enterprises which have been analyzed. Only 31.6 % of these enterprises have lands either 5.9 ha or bigger. When total fruit land size is taken into account in the research area, it has been observed that 25.5 % of this land is ≤ 1.9 ha, 25.5 % of this land is between 2.0-2.8 ha, 23.5 % of this land is between 2.9- 4.4 ha. That means 74.5 % of fruit land is ≤ 4.4 ha.

It is also determined that 54.1 % of the farmers received education that lasted 5 years or less while 17.3 % of them received education that lasted 8 years. Likewise, 28.6 % of these farmers had an education which lasted between 9 and 14 years. Considering these data, farmers' education level is low.

It has also been discovered that 74.5 % of the farmers in the research area is a member of an agricultural cooperative whereas 25.5 % of them is not a member of any agricultural cooperatives.

It is also interesting that 32.7 % of the farmers work in industries as well. Some farmers are working in other areas since they cannot earn enough money from fruit production while some are using non-agricultural gainful activities to meet the expenses of fruit production.

Factors Affecting Fresh Fruit Production

Farmers have been asked whether they plan to enlarge their fruit lands or not. The rate of the farmers who plan to enlarge their orchards has been indicated to be significant in terms of continuing production. It has also been measured whether independent variables affecting orchards enlarging are significant or not for independent variables. For that reason, factors affecting fruit production have been revealed through Logistic Regression Analysis.

While 53.0 % of the farmers plan to enlarge their orchards, 47.0 % of them do not plan an enlargement. Average age of the farmers planning to enlarge their orchards is 47 years. In a similar way, average experience of farming of the farmers planning orchards enlarging is 26 years while their average growing is 24 years.

Hosmer and Lemeshow test statistic displaying Chi-square distribution have been employed in order to examine variable compliance in the model. As a consequence, with 8 degree of freedom, Chi-square table value has been found 7.113, $p=0.524$. The compliance in the model has

been observed to be high because Chi-square value is greater than table value.

Wald value in Logistic Regression Analysis is one of the criteria about variables. Considering the fact that Wald is important for values greater than 2, it could be pointed out that probability value gets smaller when Wald value gets greater. When p probability value of the variables the Wald values of which are greater than 2 are taken into account, it is seen that they are statistically significant while they are not statistically significant if their Wald values are smaller than 2 (Aksaraylı and Saygın, 2011). In this context, it has been determined that farmers' age (6.61), farmers' education level (2.29), the share of fruit land in total land (3.27) variables are significant since they are greater than 2.

The results of Logistic Regression Analysis carried out to find out the probability of enlarging orchards are indicated in Table 3. According to the results, some independent variables like farmers' education level and production amount have been defined as insignificant in terms of enlarging orchards.

Therefore, such characteristics have not been observed to be important for farmers' enlarging their orchards. To elaborate, education and production amount are not influential on farmers' developing strategies about enlarging orchards.

Table 3. Factors affecting farmers' decision to continue production

	Coefficient	Std. Error	Wald	df	Odds	Sig.
Constant	-1,31	1,17	1,26	1,00	0,27	0,26
Farmers' age	0,54	0,21	6,61	1,00	1,71	0,01**
Farmers' Education level	-0,39	0,26	2,29	1,00	0,68	0,13
The share of fruit land in total land	0,88	0,49	3,27	1,00	2,41	0,07*
Production Amount	-0,27	0,20	1,84	1,00	0,76	0,18

*Significant for 10% level. ** Significant for 5% level.

On the other hand farmers' age variable has been seen as significant in 5 % level of importance, and its sign is positive. That is, if there is one year increase in the farmers' age, this means that farmer's enlarging orchards increases at 1.71 times more. When farmers' age is getting older,

enlarging orchards is perceived as a necessity. And this could be viewed as a situation that might create a risk in terms of continuing fruit production.

Another significant variable in the model is the share of fruit land in total land. Coefficient sign of

this variable is positive, and it is statistically significant in 10 % level of importance. It has been observed that farmers are more likely to enlarge their orchards at 2.41 times more when land size increases.

Two factors affecting fruit production have been observed to be significant. An increase in the farmers' age and the share of fruit land in total land have a positive impacts upon fruit production.

Factors Affecting Fresh Fruit Marketing

Marketing fresh fruits is important in fruit growing as in other branches of agricultural production. Initially, marketing problems have been focused. According to 32.7 % of the farmers, there is always a marketing problem whereas 26.5 % of the farmers state that they sometimes face with marketing problems. Likewise, 40.8 % of the farmers claim that there is not a marketing problem.

Factors affecting fresh fruit production have been analyzed through Logistic Regression Analysis because nearly 60.0 % of the farmers face marketing problems. This analysis has been employed through Multinomial Logistic Regression because there is not a scaling relationship among answers (never, always, sometimes) (Tatlidil, 2002; Miran, 2008).

Regression Analysis can be employed for two variables or more than two variables to focus on multiple relationships (Miran, 2008). In this study, dividing category numbers into two and using Binary Logistic Regression Analysis have not been preferred because it could cause disinformation and could not answer key questions. Ordinal Logistic Regression analysis has been used to examine ordinal variables.

In this context, dependent variables have been divided into three, and Multinomial Logistic Regression Analysis have been decided to be the most suitable and preferred method to investigate categorical variables.

The aim of such a method is to examine the relationships among farmers' age, the share of fruit growing experience in farming experience, the share of fruit land in total land, incomes from farming out, benefiting from agricultural supports. There are a lot of categories in this model, hence choosing a reference group is in a way a necessity. Reference group includes the first group in which

farmers claim that there is always marketing problem.

Hosmer and Lemeshow test statistic displaying Chi-square distribution have been employed in order to examine variable compliance in the model. As a consequence, with 46 degree of freedom, Chi-square table value has been found 35,349, $p=0.873$. The compliance in the model has been observed to be high because Chi-square value is greater than table value.

The results of multiple regression analysis have been divided in two groups. These are the groups claiming that "there is never marketing problem" and "we sometimes face marketing problems" except for reference category.

In the first part of the model, incomes from farming out has been observed to be statistically significant for the research area. Incomes from farming out variable in the first part of the model is significant at a level of 10 %. Coefficient sign of independent variable is positive. If the incomes from farming out increases one unit, it means that logarithm of two possibilities change at a level of 1.17. Therefore, when the incomes from farming out increase, the situation in which marketing problems are never experienced could be met more often.

Proportional hazard is defined as the ratio of the probability of preferring one category to the probability of preferring reference category. In this respect, when the incomes from farming out increases one unit, proportional hazard of experiencing marketing problems to never experiencing marketing problems increase at 3.23 times more.

The fact that incomes from farming out is a significant variable in the first group, that makes farmers think that they never experience marketing problems when incomes from farming out increase one unit. In the second group, incomes from farming out is not significant.

In the second part of the model, farmers' age and the share of fruit growing experience in farming experience independent variables have statistically been seen as significant.

Farmers' age has been observed to be significant at a level of 10 % in the second part of the model, and its coefficient sign is negative. When farmers' age decreases one year, the situation in which marketing problems sometimes faced increases at the rate of 0.43. When farmers' age decreases

one year, the proportional risk of the situation in which marketing problems are never or sometimes faced increases at 0.64 times more. In this respect, if farmers' age decreases, the situation in which marketing problems are never or sometimes faced decreases as well. That is, an increase of farmers' age has negatives impacts upon marketing problems. This is basically related with the fact that old farmers are more experienced and they insist on making use of traditional marketing methods.

Another independent variable that has been observed to be significant in the second part of the model is the share of fruit growing experience in farming experience. The share of fruit growing

experience in farming experience has been traced to be significant at the rate of 5 % and its coefficient sign is negative. When the share of fruit growing experience in farming experience decreases one year, the situation in which marketing problem is faced increases at a level of 2.56. If the share of fruit growing experience in farming experience decreases one year, the proportional risk of the situation in which marketing problems are never or sometimes experienced increases at 0.77 times more. Therefore, if the share of fruit growing experience in farming experience decreases, marketing problems will be observed (see below Table 4).

Table 4. Factors affecting marketing problems

	Coefficient	Std. Error	z	Odds Ratio	Sig.
const 1					
(Never)	-0,443	2,977	-0,149	0,641	0,881
Age	0,007	0,242	0,031	1,007	0,975
Experience	-1,665	1,243	-1,338	0,189	0,181
Incomes from farming out	1,175	0,597	1,966	3,238	0,049**
Agricultural supports	0,938	0,599	1,566	2,557	0,117
The share of fruit land in total land	0,139	0,547	0,254	1,150	0,799
const 2					
(Sometimes)	3,542	2,933	1,207	34,540	0,227
Age	-0.436	0,259	-1,680	0,646	0,093*
Experience	-2,563	1,237	-2,072	0,077	0,038**
Incomes from farming out	0,269	0,581	0,463	1,309	0,643
Agricultural supports	0,087	0,644	0,136	1,092	0,891
The share of fruit land in total land	0,851	0,623	1,365	2,342	0,172

*Significant for 10% level. **Significant for 5% level.

Conclusions

There are a number of problems in fresh fruit production in the research area. Some of these might be listed as such: Fruit lands of the farmers are usually small and fragmented, these kinds of farms are generally family enterprises and

nonspecialized, input costs necessary for production are high, fruit growing is not economically supported, productions are not in accordance with quality standards, farmers are not organized and farmer organizations do not work efficiently.

Another important point of fresh fruit production is related with marketing. When fruits are not sold, it does not bring economic return. Besides, products of the farmers might go to waste. And this results in wastage of scarce sources. Some of the problems encountered while marketing are: transportation costs are high, there are not enough cold storage rooms, there are some deficiencies in terms of packing, cooperatives and organizations cannot work efficiently and marketing channels are long.

Such problems which are experienced during production and marketing are also faced in the research area. Farmers' education level is not high. Lands which are usually small and fragmented have also been encountered in the research area. There is not a special supporting policy or mechanism for fresh fruit production. Some of the farmers are engaged in a number of different occupations since they cannot earn enough money while some of the farmers use such incomes from farming out to meet the costs of fresh fruit production. Although the number of farmers who have cooperative membership is high, cooperatives do not work enough and therefore they cannot be effective during production process. Retailers do not buy the produce at a higher price because of the fact that products are not in accordance with quality standards.

Fresh fruit farmers in the region have marketing problems more than production problems. As in other branches of agricultural production, farmers should unite under a certain organization or cooperative in fresh fruit production as well. It has been observed that cooperatives are not efficient enough. The most common marketing problem in the region is that farmers have to sell their products at a lower price to retailers in the

farmyard. More than half of the farmers have stated that they have difficulties in repayments. Some of these problems are also related with the fact that retailers pay late or do not pay back.

In spite of these, nearly half of the farmers plan to enlarge their orchards. Farmers' age and the share of fruit land in total have been found out to be significant upon the idea of orchards enlarging. An increase in farmers' age increases the probability of enlarging orchards too. When the share of fruit land in total land increase, farmers think that it is a necessity to enlarge their orchards. Farmers, who has more ratio of orchards in total garden, would like to enlarge their orchards since they will gain more profit.

When the incomes from farming out increase, marketing problems decrease to a certain extent, however marketing problems are faced more when farmers' age and the share of fruit growing experience in farming experience increases. This situation could be associated with the fact that more farmers who has incomes from farming out can better express their own problems.

Fruit production, a branch of plant production, should be supported through special policies and mechanisms. Some specific solution suggestions should be offered for fruit growing sector along with agricultural production as a whole. Some of these suggestions are to determine and implement specific policies for fruit production and marketing, to take inputs that are commonly used in fruit growing into the scope of economic support, to ensure agricultural organization in order to sustain specialization in fruit growing, to take precautions in order to lower the costs of warehousing and transportation and to promote production in accordance with quality standards in order to market these products in international markets.

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