

COST ANALYSIS OF TOMATO GROWING ACTIVITY IN THE TURKISH REPUBLIC OF NORTHERN CYPRUS (TRNC): CASE OF FAMAGUSTA

KUZEY KİBRİS TÜRK CUMHURİYETİ'NDE (KKTC) DOMATES YETİŞTİRİCİLİĞİ FAALİYETİNİN MALİYET ANALİZİ: MAĞUSA ÇALIŞMASI

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Abstract: Tomato, which belongs to the fresh vegetable and fruit group, can be consumed fresh with important human health values, as well as being used in the food industry as a raw material input in the production of products. The purpose of the study is cost analysis, determination of unit product price, process problems and solution suggestions in Famagusta. In the research, face-to-face surveys were conducted with 44 enterprises determined according to the "Simple Random Sampling Method". The data obtained belong to the year 2019. It has been determined that tomato production in the greenhouse in Famagusta district is carried out in 2 periods. The Male Business Unit (MBU) in Enterprises is calculated as 1.34. Production cost in 1 decare greenhouse was determined as 60674,88 £ and unit product cost as 4,33 £/kg. The cost item with the largest share in the production period was the family labor wage with 15.62%. It was concluded that the biggest problem faced by the manufacturers throughout the process was the lack of marketing process and wholesaler market law with 94.28%.

Keywords: Tomato, business cost analysis, Male Business Unit (MBU), efficiency.

Öz: Yaş sebze ve meyve grubuna ait olan domates, insan sağlığı açısından önemli değerleri ile taze olarak tüketilebildiği gibi, gıda endüstrisinde de ürünlerin üretiminde ham madde girdisi olarak kullanılmaktadır. Bu çalışmanın amacı Gazimağusa'da maliyet analizi, birim ürün fiyatının

belirlenmesi, süreç sorunları ve çözüm önerilerinin sunulmasıdır. Araştırmada "Basit Tesadüfi Örnekleme Yöntemi"ne göre belirlenen 44 işletme ile yüz yüze anket yapılmıştır. Elde edilen veriler 2019 yılına aittir. Gazimağusa İlçesindeki serada domates üretiminin 2 periyotta gerçekleştirildiği belirlenmiştir. İşletmelerde Erkek İş Birimi (MBU) 1,34 olarak hesaplanmıştır. 1 dekar serada üretim maliyeti 60674,88 £, birim ürün maliyeti 4,33 £/kg olarak belirlendi. Üretim döneminde en büyük paya sahip maliyet kalemi %15,62 ile aile işçiliği ücreti olmuştur. Üreticilerin süreç boyunca karşılaştığı en büyük sorunun %94,28 ile pazarlama süreci ve toptancı hal kanunu eksikliği olduğu sonucuna varılmıştır.

Anahtar Kelimeler: Domates, işletme maliyet analizi, Erkek İş Birimi (MBU), verimlilik.

INTRODUCTION

Due to the rapidly increasing world population, the demand for the needs of people to sustain their lives is growing rapidly. In this context, the need for nutrition plays the most active role in the process of meeting all basic needs. The agricultural sector and agricultural production, which are the basis for the provision of food needs that are of great importance for societies, should also be in a continuous development and change movement in order to meet the increasing demand. Agriculture, in its general sense, deals with the process of producing, processing, storing, developing and marketing plant and animal products. In addition, the agricultural sector is important in terms of meeting people's nutritional needs and providing income to countries through employment and export. Considering that agricultural lands are a national wealth, it is considered important to consider not only the economic activities of the enterprises, but also their social and environmental impacts (Tursun, 2023).

Crop production, which is one of the components of agricultural production and includes the production of grains, legumes, seeds, cotton, fresh vegetables / fruits, etc., is of great importance both in terms of direct use and in terms of providing raw materials to other sectors. Tomato, which is from the fresh vegetable group, is grown in almost every region of the world provided that appropriate ecological conditions are provided in terms of its benefits to human health and contributes to the economies of the country.

As in all areas of life, change and innovation have also manifested themselves in the agricultural sector. The settlements that expanded in parallel with the increasing world population have partially reduced the agricultural areas and have brought innovative ideas that will ultimately increase the quality product and production capacity in the agricultural sector.

Tomato cultivation activities in the Turkish Republic of North Cyprus are carried out in two ways: in underground production and in the open, where suitable growing conditions are provided with climatic conditions, geographical structure and long-term sunshine time.

In regions where open tomato production is generally intense, the formation of strong winds, which is thought to harm greenhouse structures, necessitates open-field tomato production.

Until the 1970s, the main economic activity on the island of Cyprus was agriculture. Accordingly, in this period, 1/3 of the population made a living from agricultural activities and at the same time, 70% of the total exports consisted of agricultural products. Although the agricultural sector has continuously declined from

those times to the present day, especially in the face of tourism and service sectors, it is still mentioned today.

While 27.6% of the population was employed in agriculture in 1989, 21.2% in 1996 and 13% in 2004, a striking decrease was observed in the population engaged in agriculture among the working population in 2008, and it was found that only 3.5% (3171 people) of the working population (3171 people), which was 91,223 in total, made a living with agriculture (Erbilen & Şahin 2001:197).

While there is an increase in the amount of product produced and the area planted to date, there are slight fluctuations in yield per acre. In 2018, 6189 tons of product was harvested in an area of 1642 acres and a yield of 3769 kg/dnm was achieved. When the aforementioned years are considered, we see that the most productive year is 2015 with 3932 kg / dnm, while the year with the highest product harvest is 2015 with 6594 tons.

Table 1. Tomato production in the TRNC, planted area and yield

Years	Production quantity (tons)	Cultivated area (dnm)	Yield (kg/dnm)
2018	6to 189	1642	3769
2017	5,837	1677	3481
2016	5th244	1399	3748
2015	6,594	1677	3932
2014	5,694	1490	3823
2013	5296	1376	3849
2012	4165	1149	3625
2011	3952	1110	3560
2010	3441	1021	3370
2009	3487	972	3,587

Source: TRNC Ministry of Agriculture and Natural Resources, 2018.

When the 10-year period covering the years 2009-2018 is considered, in the light of the results obtained from the Ministry of Agriculture and Natural Resources, we see that the most productive year in terms of tomato production in the TRNC is 2015 with 6594 tons and 2010 is the year with the least production. While the peak production capacity in Famagusta district is observed as 2016 with 524 tons, 2010 was recorded with a production capacity of 88 tons as the year with the lowest production volume. An average of 75.50% of the total tomato production in the TRNC takes place in greenhouses and tunnels.

Table 2. TRNC and Famagusta district tomato production volume

Years	Tomato production volume in TRNC (tons)	Tomato production volume in Famagusta district (tons)
2018	6189	498
2017	5837	265
2016	5244	524
2015	6594	394
2014	5694	406
2013	5296	463
2012	4165	234
2011	3952	151
2010	3441	155
2009	3487	88

Source: TRNC Ministry of Agriculture and Natural Resources, 2020

Agricultural diseases encountered in the tomato production stage in Famagusta district, pest formation, as well as the imbalance in the marketing system and the pricing problem it brings with it adversely affect the profitability of the producers. In this context, it is aimed to explain the factors affecting the production of tomatoes, which ultimately reach the consumer at high prices with continuous fluctuations, and the production structure, marketing system, period production cost and the problems faced by tomato producers and their solution proposals.

This study is important in terms of ensuring the economic maintenance of families whose main source of income is agriculture, increasing production and increasing GDP and contributing to the economy.

Due to its geographical location, we observe that the sunbathing is 12 hours in the average summer months and 5 hours in the winter months, and that the tomato growing sector in our country, which has suitable topographic conditions for agriculture, has shrunk dramatically. In addition, irregular pricing policies leave the sector in a difficult situation. In this context, the following questions have been tried to be answered.

- What are the techniques of tomato production?
- Who are the factors involved in the marketing system and what are their responsibilities?
- How are pricing policies assigned?

- How much does a tomato cost to?
- What are the problems that manufacturers face in the whole process?

1. METHOD

This study was carried out entirely within the framework of ethical rules and reproducibility in accordance with academic rules. The research was carried out with screening technique from quantitative research methods. In the study, data were obtained by conducting face-to-face interviews through a survey with 44 tomato producers operating in Famagusta district and selected according to the "Simple Random Sampling Method".

2. LITERATURE

It is possible to talk about a fairly wide platform for the work carried out to date on the cultivation of tomatoes. As a result of the literature search, very important data and propositions were accessed and the summaries on the subject are mentioned below.

Çeltikçi (2008) found that the real prices of tomatoes in Antalya province were above seasonal averages in February, March, April, May, November and December, and below the averages in other months.

Güler (2018) concluded that 58.2% of the employable population in enterprises consists of men and women between the ages of 15-49, and the educational status of the total working personnel is primary and secondary school level with 73.3%. It was found that the average age of the operators was 52 and 26.67% of the total business owners within the research area had an additional source of income. It concluded that 96.2% of the enterprises were insecure because they could not benefit from the results of the pre-commissioned soil analysis and did not have the soil analysis done. It was determined that 8.06% of tomato production costs consisted of fixed costs and 91.9% of variable costs.

In their study Güryay, Şafaklı ve Tüzel (2005), they determined that the share of agricultural workers in total employees in the TRNC in 1999 was 17.76% and the share of those working in the agricultural sector in the EU was 1.76%.

In their study, Malik, Mughal, Mian and Khan (2018) draw attention to tomato productivity in Pakistan that has been stagnant for the last 50 years, the rapidly increasing country's population and the scarcity of agricultural areas, and that it is inevitable to increase productivity for the country, and accordingly, traditional methods tried in the past have failed to increase productivity. Noting that the adoption of modern technology would be the only option for Pakistan to increase the productivity of vegetables, especially tomatoes, they explained that the *Hydroponics* technology, which has been tested in increasing crop efficiency, has proven to be successful in increasing productivity in Pakistan and stated that the country's food imports will turn into exports, providing great gains to the producer and the country.

Sipahioğlu (2014) explains the main reasons for the cost and profit differences in the enterprises engaged in cultivation in different production systems, large yield differences as a result of more planting per unit area, higher quality, residue-free

products can be sold at higher prices and more easily as a result of obtaining more quality, residue-free products, and ensuring that pesticides are used more efficiently and in optimum amounts as a result of less soil-borne diseases, technological and modern heating systems and the use of irrigation systems.

Sili (2013), in his study conducted in order to determine the annual activity results of tomato growing enterprises in Bafra district of Samsun province and to measure the technical efficiency in tomato production, obtained that tomatoes were grown in 16% of the operating land and the average yield was 4846 kg / da. The research findings showed that 87% of the total capital owned by the examined enterprises consisted of land capital and 13% consisted of working capital. It concluded that the enterprises operating in the field of study could not receive sufficient income in return for the total and equity capital they had invested.

Topkara (2017), in his research on the subject conducted in Erdemli district of Mersin province, determined that the tool machine capital per enterprise in the examined enterprises was 20.099,89 TL. The largest proportion in the formation of the tool machinery capital of enterprises belongs to the tractor capital (62.33%), followed by the pulverizer (11.34%), trailer (8.68%), hoe machine (8.20%), plow (1.53%), goosebumper (0.93%). It concluded that 72.07% of the land width consists of property land and 27.93% of leased land.

Tümsavaş (2003), in his study on the level of physical input use, production costs and economic evaluation of the use of chemical fertilizers in wheat and tomato production activities under irrigated conditions in agricultural enterprises of Ayaş district of Ankara province, determined that 162.23 hours of labor force and 25.53 hours of towing power are needed for one decare of tomato production in the enterprises surveyed.

3. FINDINGS

Tomato cultivation in Famagusta district takes place on the Red Mediterranean lands or the lands called "terra rossa". Materials such as clay and iron oxides, which are more difficult to decompose in limestone that decompose by carbonation, form red soils. Terra rossa is generally defined as soils that develop on limestone or dolomite, have red color and clay or silty clay texture (Günal, 2006).

Even if the measures taken against pests in the region are at an adequate level, tomato production continues only in the form of underground production due to the fact that the struggle period is very long and costly, and open production is not a supported production method. Almost all of the undercover cultivation is carried out in the form of double sowing due to the return element, and the 1st period is between August and December, and the 2nd period is between December and April. Single sowing is practiced very rarely and it is among the information obtained that the production period is between April and August. The types of undercover production, all of which take place in plastic greenhouses, are ownership, rent and partnership.

Although the middle-aged and older groups make up the producers in the crucial agricultural sector, and the business owners have the population (family members) to ensure business continuation, in the enterprises under investigation, the young family members working in the field have a different status from the rest of the population

rather than a sense of belonging. Considering this issue when calculating the labor force, young family members were not included in the cost calculation because they did not provide a full labor force.

In 68.18% of the enterprises (30 enterprises), business owners together with their spouses constitute the family labor force. In the 44 enterprises examined regarding tomato cultivation, it was concluded that the age range of the business owners of 22 enterprises was 18-49 and 22 enterprises were 50 and over. The 33 individuals (43.31%) who make up the family workforce are between the ages of 15-49 and 45 individuals (57.69%) are between the ages of 50 and over.

Table 3. The age range of the female and male population of the family labor force in enterprises

Age range	Woman	Male
0-14	0	0
15-49	11	22
50 and over	19	26

The educational status of the business owners was examined and it was concluded that no illiterate business owners were found, that the business owners with primary school graduation had the largest share with 52.27%, and the business owners with university degrees with 4.55% found themselves in the last place in this list.

Table 4. Educational status of business owners

Charge status	Number	%
Primary school	23	52,27
Secondary school	12	27,27
High school	7	15,91
University	2	4,55

When the sector experience factor of the business owners in the enterprises is examined, it is concluded that the year range with the largest share is 16-30 with 77.27% and the number of business owners with 31 years or more of sector experience is 3 with a rate of 6.82%.

Table 5. Business owners' industry experience

Experience	Number	%
5-15 years	7	15,9
16-30 years	34	77,27
31 and above years	3	6,82

They answered the question directed to their sides about whether the producers have external income other than tomato cultivation, which is the real income element in the enterprises examined. Accordingly, the number of business owners with additional income among 44 enterprises is 23 people. The element with the largest share among the business owners with additional income element is retired individuals with a rate of 39.13% and 9 people.

Table 6. External income status of business owners

Additional income elements	Number	%
Retired	9	39,13
Civil servant	2	8,7
Worker	7	30,43
Merchant	3	13,04
Chauffeur	2	8,7

In line with the results obtained from the research area, it was concluded that satisfaction with the marketing system was low with a large rate of 86.36% and 38 producers. In the interviews with the producers who are satisfied with the marketing system, it was learned that it would not be possible for the marketing of the goods produced to be carried out by them because they were the chief elements of the production process, and at the same time they approved the marketing chain because there was no alternative and with a psychology of habituation.

Table 7. Producers' marketing system satisfaction and their view of organic production

	Yes	No
Do you support organic production?	44	0
Are you satisfied with the marketing system?	6	38

In the light of the data obtained from the enterprises, all producers supported organic production, while 23 producers also claimed that organic production could not be carried out on the territory of the TRNC.

As a result of the interview conducted by face-to-face survey before 44 manufacturers, producers were asked to score between 1 and 5 according to the importance of the problems they encountered in preparation, production and marketing processes. Accordingly, the biggest problem faced by the producers is the lack of marketing process and state law with 94.28%. One of the important pillars of the problems faced by the producers was the cost factors with 82.86%. In the interview with the producers, it was learned that the most insignificant problem was the diseases and pests with 29.99% and it was found that the reason was the learning of the struggle and the absence of renewed diseases and pests.

Table 8. Manufacturing process issues

Problem	%
Diseases and pests	29,99
Input costs	82,86
Encouragement and support	65,71
Lack of marketing process and state law	94,28

According to the results obtained from the interviews with the producers, it was found that the production was carried out in 3 different areas and ways. In this case, when the areas where producers produce are considered, the land assets of 31 business owners belong to themselves and 4 business owners carry out their activities with partnership. Conditions of partnership with tomato cultivation carried out in Famagusta district;

- The property ownership is to the landowner and the variable expenses are half to the owner and the shareholder, the income is 1/2 for both parties.

- The fact that all the elements and costs of production belong to the owner, labor belongs to the partner. 2/3 of the income goes to the owner.

Table 9. Land use situation

Land use case	Number	%
Ownership	31	70,45
Lease	9	20,45
Sharecropping	4	9,09

In order to calculate the labor force as a single unit in the enterprises, the labor force total was converted into the Male Labor Force Unit (EIB). In the conversion of the population to EIB, the coefficients of 0.50 for 7-14 years, 0.75 for women aged 15-49, 1.0 for men, 0.50 for women aged 50 and above, and 0.75 for men were taken (Rad and Yarşılı, 2005).

The owners of the 44 businesses under review are all male individuals. Among the business owners, the family labor force in 30 enterprises is formed by the male owner and their spouses, while in 4 enterprises the brothers are the owners and at the same time constitute the family labor force. The remaining 10 businesses are the only individuals in the family workforce and the male individual in the position of property owner.

In the examined enterprises, it was concluded that women worked 184 days during the 1-year production calendar, including 85 days in the 1st production period of 2019 and 99 days in the 2nd production period, and men worked 195 days during the 1-year production calendar, including 90 days in the 1st production period and 105 days in the 2nd production period. While women work 9.35 hours a day during the production period, this rate is 12.65 hours in male individuals. According to the calculations, the EIB was calculated as 1.34 in tomato production activities in 2019 and it was determined that 3852 hours / year were worked.

Rad and Yarşılı (2005) in their research on the economic performance and unit product costs of the enterprises growing tomatoes in the greenhouse in Silifke district

determined that the average EIB was 1.09 and the average working hours was 3952 hours/year.

Table 10. Labor force utilization status of family members (with EIB account)

Family workforce	Sum							
Woman	Male	Number(EIB)	Hour					
Number(EIB)	Hour	%	Number(EIB)	Hour	%			
17,75	23970	29,6	41,5	57024	70,4	59,25	80994	
17,75	27600	31,17	41,5	60960	68,83	59,25	88560	
0,4	544	--	0,94	1296	--	1,34	1840	
0,4	627	--	0,94	1385	--	1,34	2012	
Production period total	1,34	3852						

In all of the examined enterprises, it was determined that foreign (paid) labor force was needed and utilized, especially during planting and harvesting times, and for 2019, the average wage of workers to work 8 hours a day is 100.00 ₺.

In Famagusta district, tomato production, which continues in air-conditioned, normal and modern greenhouses, is carried out in 2 (two) periods. The 1st production period is between August and December, and the 2nd production period is between December and April. Producers carry out commercial production activities in two periods due to the high cost element. Due to the hot climatic conditions in the summer production period, the decrease in yield due to the burning and shedding of plant flowers makes winter production (2nd period) inevitable.

In accordance with the "Regulation on Keeping Records of Agricultural Producers and Supporting Agricultural Producers", 1 government acre (14400 square feet = 1338 m²) was taken as the basis for the cost table.

Variable costs were found on the basis of the financial payments made by the producers to the persons, institutions and organizations to which they supplied goods during the production period. The sum of the variable costs against the working capital interest was reached by making a term deposit calculation from the opportunity cost items based on the 15% agricultural loan interest rate of the Republic of Turkey Ziraat Bank (Famagusta Branch) in 2019. Net interest income was found by deducting 10% withholding applied to the gross income of the said bank on the deposit interest with a maturity of 2019.

From fixed cost items;

- When calculating the family labor force provision, the daily wage of 100,00 ₺ paid to the wage workers in 2019 was taken as the basis.
- When calculating the bare land interest provision, the sales price of 1 acre of land in the production region for the year 2019 has been accepted as 40.000,00 ₺ and the way followed in the calculation is the same as the method applied in the calculation of the working capital interest provision.

3. The cost of 1 acre of greenhouse, which can be started to be produced while calculating the greenhouse investment interest provision, is calculated as 79.385,00 ₺ with the market prices of 2019 and the path followed in the calculation is the same as the method applied in the calculation of the working capital interest provision.

4. When calculating the machine capital against interest, all the machines used in the process (tractor, hoe machine, pulverizer and cultivator) were calculated as 44.300,00 ₺ with the market prices of 2019 and the way followed in the calculation is the same as the method applied in the calculation of the working capital interest provision.

5. The greenhouse skeleton used in the depreciation calculations and the market prices for 2019 for all the equipment and machines for production were obtained separately and the useful lives reported by the producers were taken into consideration and calculations were made with Equal Consistent Depreciation. The rates specified in the "Communiqué on Depreciation Rates of Economic Assets Subject to Depreciation" list of the TRNC Official Gazette dated August 13, 2013 and numbered 430 are not taken as basis.

Since the supply of 6.Ar is close to impossible for the enterprises, bee fertilization is not carried out at the production stage and therefore it is not included in the cost calculation.

In the production period of 2019, the production cost in 1 acre greenhouse was found as 60.674,88 ₺. Fixed costs constitute 58.05% (35.212,9 ₺) of the total cost, while the variable cost ratio is 41.95% (25.461,98 ₺). It was determined that the cost item with the largest share in the production period was the family labor force wage provision with 15.62%.

Table 11. Cost table for the production of tomatoes per 1 acre

Cost table for the production of tomatoes per 1 acre				
No	Cost item	Price	%	% of Total
1	Soil preparation	369,11	1,45	0,61
2	Seedling/seedling	8404,28	33	13,85
3	Organic fertilizer	284,22	1,12	0,47
4	Chemical fertilizer	5915,6	23,23	9,75
5	Pesticide	3465,5	13,61	5,71
6	Heating	491,25	1,93	0,81
7	Water and electricity	2654,69	10,43	4,37
8	Plant repair and maintenance	264	1,04	0,43
9	Labor	2.270,00	8,91	3,74
10	Revolving capital interest provision	1.343,33	5,28	2,21
11	Sum of variable costs	25461,98	100	41,95
12	Family labor force provision for wages	9.475,00	26,91	15,62
13	Bare land interest provision	4.575,74	12,99	7,54
14	Greenhouse investment interest provision	8.893,10	25,26	14,66
15	Depreciation of greenhouse facility expenses	5.410,00	15,36	8,92
	Machine depreciation	1.921,00	5,46	3,17
16	Machinery capital against interest	4.938,06	14,02	8,14
17	Total fixed costs	35.212,90	100	58,05
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18	Total production costs	60674,88	---	---

In his research on tomato production and market analysis in Antalya, Çeltikçi (2008) found that 70.54% of the production expenditures for tomato production consisted of variable and 29.46% of fixed expenses.

In this study, within the framework of cost analysis, the expense element with the highest ratio among variable costs was seed/seedling expense with 33.00%, while family labor wage provision was determined as the item with the highest rate of fixed costs with 26.91%.

In his study, Güler (2018) concluded that the highest share of tomato production costs in the fixed expenses range was field rent with 65.7%, and the cost item with the highest share in the changing costs was the harvesting and transportation cost with 45.1%.

Tomato producers in Famagusta district harvested an average of 14,000 kg of tomatoes from 1 acre of planted area in the 2019 production period. After analyzing all cost factors, the unit product cost was found to be **4.33 ₺/kg**.

Table 12. Production volume and unit product cost table

No	Cost item	Price
1	Total production costs	60. 674.88
2	Production volume	14. 000 kg.
3	Unit product cost	4.33 ₺/kg

Another region where cost research was carried out was the Tepebaşı region. Due to the fact that the strong winds in the region damaged the greenhouse structures, the unit cost of the tomato produced in the open was determined as 4.71 ₺ / kg.

Table 13. Periodic cost table for tomato production in front of 1 d

Periodic cost table for the production of tomatoes per 1 acre			
No	Cost item	1st period	2nd period
1	Soil preparation	246,18	122,93
2	Seedling/seedling	4202,14	4202,14
3	Organic fertilizer	142,11	142,11
4	Chemical fertilizer	2957,8	2957,8
5	Pesticide	1732,75	1732,75
6	Heating	0	491,25
7	Water and electricity	1568,97	1085,72
8	Plant repair and maintenance	264	0
9	Labor	1220	1050
10	Revolving capital interest provision	686,96	656,37
11	Sum of variable costs	13020,9	12441,07
12	Family labor force provision for wages	4375	5100
13	Bare land interest provision	2287,87	2287,87
14	Greenhouse investment interest provision	4446,55	4446,55
15	Depreciation of greenhouse facility expenses	2705	2705
16	Machine depreciation	960,5	960,5
17	Machinery capital against interest	2469,03	2469,03
18	Total fixed costs	17244	17968,95
19	<i>Total production costs</i>	30264,9	30410,02
20	<i>Periodic cost ratio over the total production period</i>	49,88%	50,12%

Due to the destruction caused by pests in the summer planting in Famagusta district and the invulnerability of plant flowers to climatic conditions, the yield tends to be low compared to the winter planting period. The fact that input costs are close to each other for both periods, but the yield is low in the summer season, has made producers unable to escape from the winter planting activity. Therefore, in Famagusta district, where all producers do double planting, the 1st period takes place between August and December, and the 2nd period takes place between December and April.

Since the 1st production period is carried out between August and December, there are no heating costs. Since the plant repair and maintenance expenses were made at the beginning of the total production period, they were shown as an expense element in the 1st production period.

In the production period of 2019, the production cost of the 1st production period in 1 acre greenhouse was found to be 30264.86 ₺ and the production cost of the 2nd production period was 30410.02 ₺. The ratio of expenses recorded during the total production period was 49.88% for the 1st production period and 50.12% for the 2nd production period. While the greenhouse investment interest provision is the highest cost element of the 1st production period with 4446,55 ₺, the family labor force wage provision is the leader with 5100,00 ₺ for the 2nd production period.

Although the total cost ratios are very close to each other within the framework of the cost analysis made on a period-by-period basis, the difference in production volume cannot be ignored. Producers obtain 5500 kg of product in the 1st production period, while this figure is 8500 kg in the 2nd production period. While 39.29% of the total usable product obtained is produced in the 1st production period, this rate is 60.71% in the 2nd production period. In the reality of these data, the unit product cost was determined as 5.5 ₺/kg in the 1st production period and 3.58 ₺/kg in the 2nd production period.

Table 14. Periodic production volume and unit product cost table

No	Cost item	Price (1st production period)	Price (2nd production period)	Rate of change (%)
1	Total production costs	30264,86	30410,02	0,47
2	Production volume	5500 kg.	8500 kg.	54,54
3	Unit product cost	5.5 ₺/kg	3.58 ₺/kg	-34,9

Business owners stated that in the 2019 production year, they gave their products to the broker, which is their only marketing element, at an average of **5.25 ₺**. In line with this reality, the producers have earned a total income of 73.500 ₺, including 28.875,00 ₺ in the 1st production period and 44.625,00 ₺ in the 2nd production period. The fact that the enterprises have lost 1389.86 ₺ in the 1st production period proves that the implementation of the 2nd period production period is inevitable.

In the 2019 production period, producers made a gross profit of **₺48,038.02** and a net profit of **₺12,825.12** from 1 acre of tomato production activity.

Table 15. Gross and net profit of enterprises

No	Cost item	Price	Price	2019 production period
		(1st production period ₺)	(2nd production period ₺)	
1	Income	28.875,00	44.625,00	73.500,00
2	Gross profit	15.854,09	32.183,93	48.038,02
3	Net profit	-1389,86	14.214,98	12.825,12

Labor productivity or performance was calculated in kg/EIB. Accordingly, in the 2019 production year, labor productivity for 1 acre of tomato production was found as 10.447,76 kg/EIB in the enterprises.

As a result of the wholesaler situations created in accordance with the *Regulation on Vegetable and Fruit Trade and Wholesaler Situations* published in the Official Gazette dated 07.07.2012 and numbered 28346, which constitutes perhaps the most important segment of the marketing chain of the products produced in the Republic of Turkey, different pricing situations at the producer level have been tried to be prevented to some extent.

Manufacturers experience difficulties due to the absence of the state system in the marketing chain of the product produced in our country. After the product is taken from the field and put on the market, the brokers pay the producer at the price they determine, and as a result, the producers cannot have a say in the product pricing indirectly.

It is stated by the brokers that the notification about the prices is announced weekly from the Fruit and Vegetable Wholesalers Association and that the purchase transactions are carried out on these figures. The commission notified by the said association has fixed the rate at 20%.

CONCLUSION

Despite the existence of favorable climatic conditions and soil structure in the TRNC, it has become a question for tomatoes to reach consumers with high prices. In this context, in the interview conducted with 44 producers through a face-to-face survey, the importance of tomatoes, one of the components of the agricultural sector, which is the indispensable guest of our tables at almost every meal, was mentioned, the seasonal activities of the producers were examined, cost calculations were made, pricing policy was investigated, the marketing process was analyzed, some demographic characteristics were investigated and the following results were reached.

In 68.18% (30 enterprises) of the enterprises examined, business owners together with their spouses constitute the family labor force. It was concluded that the age range of the business owners of 22 enterprises was 18-49 and that the age range of 22 enterprises was 50 and over. The majority of the family workforce consists of 45 individuals (57.69%) with an age range of 50 and over.

The educational status of business owners was examined and no illiterate business owners were found, it was found that primary school graduate business owners had the largest share with 52.27% (23 individuals) and university graduate business owners with 4.55% (2 individuals) were at the last place of the list.

When the sector experience factor of the business owners in the enterprises is examined, it is concluded that the year range with the largest share is 16-30 with 77.27% (34 individuals).

The number of business owners with additional income in the enterprises examined is 23 people. The element with the largest share among the business owners with additional income element is retired individuals with a rate of 39.13% and 9 people.

The examined enterprises are included in the agricultural insurance upon the realization of their registration with the Application Form of the General Agricultural Insurance Fund Planted and/or Planted Lands established in accordance with the TRNC General Agricultural Insurance Law No. 40/1982 against possible damages to their greenhouses, facilities, structures, products, etc. assets.

It was learned that only 4 producers among 44 producers had soil analysis done. According to the information obtained from the Famagusta Agriculture Department, soil analyzes were made against a certain fee in line with the demands from the producers.

In line with the results obtained from the research area, it was concluded that satisfaction with the marketing system was low with a large rate of 86.36% and 38 producers. In the light of the data obtained from the enterprises, it was determined that all producers supported organic production.

With 94.28% of the problems encountered by manufacturers in preparation, production and marketing processes, the problem of lack of marketing process and state law was determined as the most important deficiency.

It has been found that tomato production in Famagusta district is carried out in 3 different areas and ways. In this case, when the areas where producers produce are considered, it is determined that the land assets of 31 business owners belong to themselves, 9 enterprises have a lease and 4 business owners carry out their activities with partnership.

All of the owners of the analyzed enterprises are male individuals. Among the business owners, the family labor force in 30 enterprises is formed by the male owner and their spouses, while in 4 enterprises the brothers are the owners and at the same time constitute the family labor force. The remaining 10 businesses are the only individuals in the family workforce and the male individual in the position of property owner.

It was concluded that women worked 184 days and men worked 195 days during the 2019 production calendar in the examined enterprises. While women work 9.35 hours a day during the production period, this rate is 12.65 hours in male individuals. According

to the calculations, the EIB was calculated as 1.34 in tomato production activities in 2019 and it was determined that 3852 hours / year were worked.

It has been recorded that the 1st production period, in which tomato production, which continues in air-conditioned, normal and modern greenhouses in Famagusta district, is made in 2 periods, is between August and December, and the 2nd production period is between December and April. Producers carry out commercial production activities in two periods due to the high cost element. Due to the hot climatic conditions in the summer production period, the decrease in yield due to the burning and shedding of plant flowers makes winter production (2nd period) inevitable.

While the cost analysis of the enterprises was carried out, the sum of the variable costs against the revolving capital interest was reached by making a term deposit calculation from the opportunity cost items based on the 15% agricultural loan interest rate of the Republic of Turkey Ziraat Bank (Famagusta Branch) in 2019. Net interest income was found by deducting 10% withholding applied to the gross income of the said bank on the deposit interest with a maturity of 2019. Accordingly;

1. In the production period of 2019, the production cost in 1 acre greenhouse was found as 60.674,88 ₺. Fixed costs constitute 58.05% (₺35,212.9) of the total cost, while the variable cost ratio is 41.95% (₺25,461.98). It was determined that the cost item with the largest share in the production period was the family labor force wage provision with 15.62%.

2. While the expenditure element with the largest ratio among variable costs was seed/seedling with 33.00%, it was determined as the item with the highest rate of fixed costs against family labor wage with 26.91%.

3. Tomato producers in Famagusta district harvested an average of 14,000 kg of tomatoes from 1 acre of planted area in the production period of 2019. After analyzing all cost factors, the unit product cost was found to be **4.33 ₺/kg**.

4. In the production period of 2019, the production cost of the 1st production period in 1 acre greenhouse was determined as 30.264.86 ₺, the producers obtained 5500 kg of product in the same production period and the unit product cost was calculated as 5.5 ₺ / kg.

5. In the production period of 2019, the production cost of the 2nd production period in 1 acre greenhouse was determined as 30.410,02 ₺, the producers obtained 8500 kg of product in the same production period and the unit product cost was calculated as 3.58 ₺ / kg.

6. In the 2019 production year, business owners gave their products to the broker, which is their only marketing element, at an average of **5.25 ₺**. In line with this reality, the producers have earned a total income of 73.500 ₺, including 28.875,00 ₺ in the 1st production period and 44.625,00 ₺ in the 2nd production period. The fact that the enterprises have lost 1389.86 ₺ in the 1st production period proves that the realization of the 2nd period production period is inevitable.

7. In the 2019 production period, producers made a gross profit of **₺48,038.02** and a net profit of **₺12,825.12** from 1 acre of tomato production activity.

8. Labor productivity in enterprises was found to be 10.447,76 kg/EIB for 1 acre greenhouse in 2019 production year.

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