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## Economic Analysis of Dairy Cattle Farms in Izmir Province of Türkiye

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### ABSTRACT

The aim of this study was to cover the economic analysis of dairy cattle farms in Turkey. The research data were obtained from face-to-face surveys of 102 dairy farms selected from the İzmir province of Turkey by stratified random sampling method in 2014. Farmers are divided into three groups according to their number of cows. According to the results of the study, as the farm size increase, daily milk yield per dairy cattle, milk production in the lactation period, and milk sales price increase. There are also positive relationships between farm size and forage planting area and the proportion of forage planting area within the total planting area. Moreover, the most common forage of cattle breeders in the province was the silage corn with 48.7%. Fixed costs accounted 12.6% of total cost and fall sharply as farm size increases. Feed costs accounted for a remarkably high proportion of total variable costs (85.1%). The Benefit-Cost Ratio was 1.84, which was increasing with the farm size.

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## İzmir İli Süt Sığırcılığı İşletmelerinin Ekonomik Analizi

### ÖZET

Bu çalışmanın amacı, Türkiye'deki süt sığırcılığı işletmelerinin ekonomik analizini kapsamaktır. Araştırma verileri 2014 yılında İzmir ilinde tabakalı rastgele örnekleme yöntemi ile seçilen 102 süt işletmesinden yüz yüze anketlerinden elde edilmiştir. İşletmeler sahip oldukları süt sığırı sayısına göre üç gruba ayrılmıştır. Araştırma sonuçlarına göre, işletme büyüklüğü arttıkça, süt sığırı başına günlük süt verimi, laktasyon döneminde süt üretimi ve süt satış fiyatı artmaktadır. İşletme büyüklüğü ile yem bitkisi ekim alanı ile yem bitkisi ekim alanının toplam ekim alanı içindeki oranı arasında da pozitif yönlü bir ilişkiler vardır. Ayrıca bölgedeki büyükbaş hayvan yetiştiricileri tarafından üretilen en yaygın yem bitkisi %48.7 ile silajlık mısırdır. Sabit maliyetler toplam maliyetin %12.6'sını oluşturmakta ve işletme genişliği büyüdükçe artıkça azalma eğilimi göstermektedir. Yem maliyetleri, toplam değişken maliyetlerin oldukça yüksek bir oranını (%85.1) oluşturmaktadır. Fayda-Maliyet Oranı 1.84 olarak hesaplanmış ve bu oran işletme büyüklüğüne göre artış göstermektedir.

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## INTRODUCTION

Milk and dairy products are the most important nutrients required for people to grow, develop and live a healthy life (Gorska-Warsewicz, 2019 and Visioli and Strata, 2014). Therefore, dairy products are so important and cannot be ignored for the continuation of human life. Studies show that 1 liter of milk can meet the entire calcium and phosphorus needs of adults. Therefore, it is necessary to increase and

support milk and milk production in order to increase the nutritional level of the society and to create better quality and sustainable food chain. In addition, milk and dairy production directly or indirectly contribute to the country's economy such as increasing national income, providing raw materials for many industries, increasing employment and export (Tandoğan, 2006; Karakaya and Akbay, 2014).

In order to improve dairy cattle farming and provide

sustainability, the sector must be examined economically. In plans and programs, it should be ensured that the profitability of the farms engaged in dairy cattle activities should be increased and enterprises with greater potential should be established. Studies should be carried out periodically to inform the farmers about the instability in milk prices and the prevention of unstoppable increases in feed costs and the use of the correct breeds (İlban, 2010).

In Turkey, especially in recent years, some studies have shown that the desired efficiency will be achieved (Tokmak, 2009). As of 2019, the average milk yield per lactation period in dairy cattle in Turkey was 3158 kg. The average milk yield in İzmir province is 3745 kg (TÜİK, 2020). The main reason for this is that almost all of the cattle breeds in the province are from the culture and culture hybrid race (Uygur, 2015).

The feed is one of the most important factors affecting the cost of farmers in dairy cattle. based on 2014 TÜİK data; in Turkey, 3.4% of the planting area of feed crops was in İzmir province. This rate has also shown that there was enough roughage for İzmir. The most important plant that makes up the roughage is silage corn. In Turkey, 11% of silage corn is produced in İzmir (TÜİK, 2020). According to 2001 TÜİK data; in İzmir, 2.4% of the agricultural farmers engaged in only livestock, while 63.0% made both livestock and crop production. As of 2014; the share of animal production value of İzmir in Turkey was 4.7%. (Gucer, 2014). The size of feed industry in İzmir has increased over the years. İzmir province meets 8.1% of its mixed feed requirement. There were 21 mixed feed factories in İzmir in 2014 (TÜİK, 2015). There were 130 dairy processing facilities in İzmir, which provide 15.0% of the milk sold in the dairy processing plant in Turkey (Gucer, 2014; Akbay and Akdoğan, 2020).

The main purpose of this study was to determine the economic analysis of dairy cattle farms in İzmir. The three specific objectives of this study were to investigate the production structure of dairy farms, to search roughage and concentrated feed amounts given to cattle, veal and heifer by farm size groups, and to analyze cost, returns and profit of milk production of dairy farms.

## MATERIAL and METHOD

The main material of the research consisted of data obtained from the agricultural enterprises engaged in dairy cattle breeding in İzmir province in 2014 through face to face survey. As the main population of the study, districts with the highest number of dairy cattle farms were selected in İzmir. Considering the cattle milked in dairy cattle farms, the survey was conducted with the farmers having at least 5 dairy cattle.

In determining the main mass of the research, districts

where dairy cattle farming are carried out in İzmir province, are concentrated. Considering the cattle provided in dairy cattle, the survey was conducted with the farms with 5 heads and more of the dairy cattle. The sample size ( $n$ ) was calculated by stratified random sampling method (Yamane, 2001):

$$n = \frac{N \sum N_h S_h^2}{N^2 D^2 + \sum N_h S_h^2} \quad D^2 = \frac{E^2}{t^2}$$

where,  $N$  is the number of farmers in the main population,  $N_h$  is the number of farmers in each stratum,  $S_h$  is standard deviation in each stratum,  $D^2$  is appropriate variance,  $E$  is the amount of error allowed from the population average,  $t$  is the value of the allowed confidence interval in the distribution table  $t$ . The sample size was determined as 102 with 95% confidence interval and 5% error. Based on the number of dairy cows including dry cows but excluding calves, heifers, and bulls, farms were classified into three groups as 5-14 heads (Group 1), 15-29 heads (Group 2), 30+ heads (Group 3). The number of farms in these groups is distributed as 47, 23 and, 32 respectively. For the purposes of the study, descriptive statistics, F-test and Chi-Square test were used to analyze the data.

Total cost is calculated with the sum of variable and fixed cost; Gross Profit (UK) is found by subtracting variable costs (labor costs, feed costs, veterinary vaccination and medicine costs, etc.) from gross production value. Net profit is calculated by subtracting the total cost from total income; per liter milk cost is calculated by dividing the total cost by the total amount of milk sold.

Inventory asset exchange (IAE) includes heifers, calves, and bulls in the farms. In the calculation of inventory asset exchange, the animal value was calculated by taking the difference between the year-end values of the animals in the farms and the beginning of year's values (at fixed prices). Those older than six months (calves) are included in the inventory change. Those younger than six months are considered as subordinate income as calf income. IAE is obtained with the help of the equation:

IAE = (End of period animal value + sold animal value + slaughtered animal value) - (per year animal value + purchased animal value)

If the result is negative (-), it is evaluated as an expense item, namely, inventory value decrease. If the result is positive (+), it is considered as operating income, namely, an increase in inventory value (Kıral et al., 1999).

## RESEARCH FINDINGS and DISCUSSION

### Socio-demographic and Economic Characteristics of Dairy Farms

The dairy animal production status of farmers is given in Table 1. The average number of dairy cattle per farm

was 26 heads, lactation period (milking time) was 267 days, average daily milk yield per cow was 21.4 kg, the amount of milk obtained in a lactation period was 5711.9 lt, and the milk sales price was 1.07 TL/lt. Moreover, the annual milk income was 121816.6 TL, the number of fattened cattle was 13.4, and the total meat sold was 3347.7 kg/year. All farms are milking

twice a day. All of the dairy cattle breeds in the farms are cultural breeds. Approximately 86% of the farms have Holstein breeds, while the remaining farms have both Holstein and other culture breeds. There is no statistical difference between farm size groups according to the percentage of Holstein breeds owned by the farms.

Table 1. Production status of dairy farms

Çizelge 1. Süt işletmelerinin yapısı ve üretim durumu

	Average	Standard Deviation
Number of dairy cattle (head)	25.70	26.44
Milking time (days)	266.91	35.34
Cow milk yield (kg/head/day)	21.40	3.26
Lactation yield (kg/head/year)	5711.87	236.52
Milk sales price (TL/lt)	1.07	0.08
Number of cattle (units)	13.36	19.11
Meat sold (kg/year)	3347.66	5 387.37
Total meat value sold (TL/year)	58715.18	959334.33
Milk income (TL/year)	121816.57	112876.45
Calf income (TL/year)	20270.91	7694.83

Both quantitative estimation and F-test results illustrated a positive and statistically significant difference between dairy farm size groups and the number of dairy cattle, milk yield, milk production in a lactation period, and milk sales price (Table 2). According to the LSD confidence interval test; while

the difference in milk yield was caused by the first group, the difference in milk sales price was determined from the third group. As the farm sizes increase, the number of dairy cattle in the farms, daily milk yield per dairy cattle, milk production in the lactation period and milk sales price increase ( $P < 0.01$ ).

Table 2. The number of dairy cattle, milk yield and prices by farms size group

Çizelge 2. İşletme genişlik gruplarına göre süt sığırlarının sayısı, süt verimi ve süt satış fiyatları

Farm size groups (number of milk cows)	Number of dairy cattle (head)	Milk yield (lt/head/day)	Lactation days (lt/head/day)	Lactation yield (lt/head/ lactation)	Milk sales price (TL/lt)
1st Group (5-14 head)	8.60 <sup>c</sup>	20.26 <sup>b</sup>	266.87	5405.57 <sup>c</sup>	1.04 <sup>c</sup>
2nd Group (15-29 head)	22.04 <sup>b</sup>	22.26 <sup>a</sup>	265.43	5908.47 <sup>b</sup>	1.07 <sup>b</sup>
3rd Group (30+head)	52.44 <sup>a</sup>	22.47 <sup>a</sup>	268.41	6024.88 <sup>a</sup>	1.13 <sup>a</sup>
Average	25.70	21.40	266.91	5761.87	1.07
F-Test	59.938*	5.931*	0.038	6.021*	19.29*
(P value)	(0.000)	(0.004)	(0.962)	(0.000)	(0.000)

\*: Statistically important at a 1% significance level.

### Use of Forage Crops in Farms

According to results, 71.3% of the producers applied different feed rotations to their animals in the region. The averages daily feed amounts given to the dairy cattle, calves and heifers of the farms were researched and explained in Table 3. According to results by farm size groups, Group 3 enterprises give concentrated feed (factory feed) to cattle, calf and heifer more than other farms.

The production of maize silage has been increasing gradually in recent years as it increases milk yield and decreases the production cost in dairy cattle. Considering the daily corn silage amount given at the farms; The farm group that gives the most corn silage is the third group with 18.3 kg/head/day for the cow, while the second group for the calf (9.7 kg/head/day) and the second group for the heifer (10.6 kg/head/day). Another noteworthy point in the table is that the farms

that give the most Straw to cattle, veal and heifers are the ones in the second group. Moreover, the farms that give the highest alfalfa to the cattle are the first group farms, while the farms that give the highest alfalfa to the calf and heifers are the second group.

Producers were asked if they produced roughage feed for their animals, and according to the answers received, 92.20% of the dairy cattle farms produced roughage feed. According to previous researches, 90.70% of the dairy cattle farms in Izmir province (Uygur, 2015) and 32.80% of the dairy cattle farms in Kahramanmaraş province (Ayman, 2014) produced roughage feed.

Total cultivated area and forage plantation areas by farm groups are given in Table 4. As the scales of the farms grow, the total and forage crops cultivation areas of the businesses tend to increase. When the relationship between farm groups and the total farm

Table 3. Feed amounts given to cattle, veal and heifer for one day by farm groups  
Çizelge 3. İşletme genişlik grupları itibariyle dana ve düveye bir günlük verilen yem miktarları

The amount of daily feed given to a head of cattle per day as of the operating groups					
Farms size groups	Cattle Daily Feed Amounts (kg)				
	Straw	Hay	Alfalfa	Corn Silage	Factory Feed
1st Group (5-14 head)	4.3	3.4	4.1	14.1	6.5
2nd Group (15-29 head)	5.7	4.3	3.2	17.2	6.9
3rd Group (30+head)	4.0	2.7	2.7	18.3	7.6
Feed amounts given for a daily head calf as of farm groups					
Farms size groups	Calf Daily Feed Amounts (kg)				
	Straw	Hay	Alfalfa	Corn Silage	Factory Feed
1st Group (5-14 head)	3.1	2.1	2.0	8.5	4.2
2nd Group (15-29 head)	4.2	3.8	2.2	9.7	4.9
3rd Group (30+head)	3.0	2.0	1.7	8.7	5.5
Feed amounts given for a head heifer per day as of farm groups					
Farms size groups	Heifer Daily Feed Amounts (kg)				
	Straw	Hay	Alfalfa	Corn Silage	Factory Feed
1st Group (5-14 head)	3.4	2.1	3.3	8.8	3.7
2nd Group (15-29 head)	4.2	3.8	3.6	10.6	3.6
3rd Group (30+head)	2.9	2.3	2.1	10.0	4.3

area owned by farmers was tested by Anova, significant differences were found between the groups. The average total area of farms was 79.52 da and the forage planting area was 39.46 da. According to the LSD confidence interval, as farm size getting increases, the total planting area and also forage planting area are statistically getting increase ( $P < 0.01$ ). On the other hand, the proportion of the forage planting area within the total planting area was 49.6%. The second farm group had the highest forage

planting area with 62.2%. But the shares by farm size groups were not statistically different ( $P > 0.05$ ).

In his research for Aydın, Nizam (2006) reported that the average total land of farmers is 128.31 da, the forage planting area within the total area was 101.15 da (78.83%), Şahin et al. (2001) reported that, for the province of Adana, the average total land assets of the farmers was 132.3 da and the share of the forage planting area in the total area was only 12.1 da (9.1%).

Table 4. Feed plant areas of farmers as of farm groups  
Çizelge 4. İşletme genişlik gruplarına göre işletmelerin yem bitkileri alanları

Farm size groups	Total area (da)	Forage production area (da)	The proportion of forage planting area within total planting area (%)
1st Group (5-14 head)	38.36 <sup>c</sup>	22.41 <sup>c</sup>	58.40
2nd Group (15-29 head)	73.04 <sup>b</sup>	45.43 <sup>b</sup>	62.20
3rd Group (30+head)	144.63 <sup>a</sup>	79.88 <sup>a</sup>	55.20
Average	79.52	39.46	49.62
F-test	18.386*	12.920*	1.586
(P-value)	(0.000)	(0.000)	(0.653)

\*: Statistically important at a 1% significance level.

In dairy cattle farms, silage corn is produced more than other products because producers want to obtain affordable and quality feed (TÜİK, 2014). While Aegean Region is at the top of the silage maize production in Turkey, this research determined that the most common forage of cattle breeders in İzmir province was the silage corn with 48.7%. The least cultivated forage in the total forage cultivation area is vetch with 1.60%. The second most planted forage by the farmers was barley with 12.7% followed by Karamba with 11.2%. Karamba plant has been one of

the forages that producers have preferred after corn silage in recent years due to its protein for dairy cattle and its use as green feed in winter. Moreover, the share of turnip plant, which balances milk yield in dairy cattle in winter and is used as a green feed plant, is 6.6% in the feed plant cultivation area (Table 5). Dairy farm owners also grow vegetables (potatoes, cucumbers, tomatoes) and olives in the area left over from forage crops. The silage corn cultivation rate of the farmers in the study area was found to be higher than the finding (42.10%) predicted by Nizam (2006)



for Aydın province.

Looking at the current warehouse conditions for the roughage and concentrated feed of dairy cattle farms; the average roughage of the first group of farmers was 24.42 tons, and the concentrated feed was 4.58 tons. In third group farms, the average available roughage was 135.34 tons, and concentrated feed was 34.54 tons (Table 6). In the research area, the existing warehouse assets increased in proportion to the dairy farm size. When the relationship between farm size groups and the roughage stock owned by farms was tested with ANOVA, significant differences were found between the groups ( $P < 0.01$ ). According to the LSD confidence interval, the amount of roughage was statistically increasing as the farm size increases.

Table 6. Roughage and concentrated feed amounts of farmers by farm size groups

Çizelge 6. İşletme genişlik gruplarına göre işletmelerin kaba ve konsantre yem miktarları

Farm size groups	Presence of roughage feed (tons)	Roughage feed (TL)	Presence of concentrated feed (tons)	Concentrated feed (TL)
1st Group	24.42 <sup>c</sup>	7391.32 <sup>c</sup>	4.58	4293.10
2nd Group	109.02 <sup>b</sup>	28658.89 <sup>b</sup>	24.21	10131.67
3rd Group	135.34 <sup>a</sup>	36484.07 <sup>a</sup>	34.54	12931.67
Average	78.85	21467.47	19.58	8572.82
F-test (P value)	8.461* (0.000)	9.414* (0.000)	1.816 (0.170)	1.668 (0.196)

\*: Statistically important at a 1% significance level.

Table 7 illustrates the situation of farmers meeting their own needs from their roughage production. According to results, 24.8% of dairy farmers had met all of their own needs, 25.7% most of them, 30.70% half of them, and only 3.0% did not meet their own needs.

Table 7. The status of meeting the need of roughage produced by the dairy cattle farmers

Çizelge 7. Süt sığırcılığı işletmelerinde üretilen kaba yemin ihtiyacı karşılama durumu

Degree	Number of dairy farms	%
Never	3	3.00
Very little of it	16	15.80
Half	32	30.70
Most	26	25.70
Entire	25	24.80
Total	102	100.00

### Economic Analysis of Dairy Production

Variable costs depending on the production amounts of farms during the year consist of feed, labor, veterinary, vaccine, and drug costs, etc. (Tokmak, 2009). The variable costs of the farms in the research area are shown in Table 8. Variable costs consisting of feed costs, barn cleaning costs, milking costs, foreign labor costs, veterinary drug cost, vaccinations, artificial insemination costs, heating, cooling and lighting costs, disinfection costs, were 33059,6 TL in the first group,

Table 5. Forage crops grown by agricultural farms (%)  
Çizelge 5. Tarımsal işletmeler tarafından yetiştirilen yem bitkileri (%)

Products	Percentages
Corn Silage	48.7
Barley	12.7
Karamba	11.2
Clover	8.1
Tourniquet	6.6
Wheat	6.1
Oats	3.0
Triticale	2.0
Vetch	1.6

70644,6 TL in the second group, 195604,7 TL in the third group and the average of all farms was 104980,0 TL. Animal insurance costs were not included in the variable costs because only one agricultural enterprise in the group insured their animals. When we look at farm groups; as the number of animals on the farm increases, variable costs also increases. Feed costs have the biggest share in variable costs.

Variable costs per animal milked by farm groups are given in Table 9. Variable costs were found to be 3628.9 TL in small farm group, 3235.7 TL in middle farm group, and 3637.7 TL in large farm group, a sizeable advantage. Fixed costs were 1102.3 TL in the first group, 577.8 TL in the second group and 398.5 TL in the third farm group. As farm size grows, fixed costs decrease and variable costs decreases for second farm size group but increases for large farm size group. Therefore, there may be significant economies of scale in dairy milk production. Feed costs account for a large proportion of total costs across farm sizes, but the average feed costs do not appear to be a source of scale economies, as they do not fall sharply with farm size. Fixed costs fall sharply as farm size increases, suggesting that large farms use their equipment and structure more effectively. As a part of fixed costs, labor costs per animal also fall quite sharply by farms size group. Larger farms can also minimize the idle time of farm equipment.

Table 8. Average variable costs by farm size group (TL)

Çizelge 8. İşletme genişlik gruplarına göre ortalama değişken maliyet (TL)

Type of Costs	1st farm size group (5-14 head)	2nd farm size group (15-29 head)	3rd farm size group (30+ head)	Average
Feed costs	26589.2	57537.3	169755.4	89200.1
Barn cleaning	403.8	1615.3	2676.6	1643.3
Milking costs	486.5	1296.7	2578.1	1523.3
Veterinarian, medicine and vaccine	2930.8	5680.0	12109.4	7205.7
Artificial insemination	829.2	1856.3	3062.5	1991.5
Heating, cooling and lighting	1560.8	2507.3	4512.5	2956.8
Costs of disinfection	259.2	151.7	296.3	236.0
Total variable expenses	33059.5	70644.6	194990.8	104756.7
Total fixed costs	10042.2	12614.1	21360.3	15034.6
Total Cost	43101.7	83258.7	216351.1	119791.3

Table 9. Variable costs per animal by farm size groups (TL/head)

Çizelge 9. İşletme genişlik gruplarına göre hayvan başına değişken maliyetler (TL/Baş)

Type of Costs	1st farm size group (5-14 head)	2nd farm size group (15-29 head)	3rd farm size group (30+ head)	Average
Feed costs	2918.7	2635.4	3166.9	3010.8
Barn cleaning	44.3	74.0	49.9	55.5
Milking costs	53.4	59.4	48.1	51.4
Veterinarian, medicine and vaccine	321.7	260.2	225.9	243.2
Artificial insemination	91.0	85.0	57.1	67.2
Heating, cooling and lighting	171.3	114.8	84.2	99.8
Costs of disinfection	28.5	6.9	5.5	8.0
Total variable expenses	3628.9	3235.7	3637.7	3535.9
Total fixed costs	1102.3	577.8	398.5	507.5
Total Cost	4731.3	3813.5	4036.2	4043.4

The share of each cost on total variable costs is illustrated in Table 10. As a result of the research, feed costs constitute the highest cost among all farm groups (85.15%), this percentage increases proportionally from the first group (80.43%) to the third group (87.06%). Increases in feed prices have substantial effects on costs. This result is similar to finding by MacDonald et al. (2007) found that feed costs account for a large share of total costs across farm sizes.

On the other hand, veterinarian, medicine and vaccine cost (8.87%) constitutes the second important cost type, and as the farm size groups, the percentage share of veterinarian, medicine and vaccine cost decreases as the farm size increases. At the same time, share of heating, cooling and lighting cost and disinfection costs decrease as farm size increases. But there was no parallel changing between farm size and barn cleaning, artificial insemination.

In the researched dairy farms, the total income, total costs, gross and net profit per milked animal according to the farm size groups are given in Table 11. Gross profit is an important criterion in terms of using scarce resources and determining competition in farms (Özüdoğru, 2012). Therefore, by comparing the gross profit values per animal milked in the researched

farms, the second group of farms is determined to be more successful by using their production tools more efficiently, while the average per animal milked gross profit was 3885.27 TL. Total costs are declining as farm size increases. The average total income per animal was 7421.21 TL and the net profit was 3377.79 TL on average. Moreover, there was a statistical difference in total revenue by farm size group. Besides, total income for large farms were 12.7% above small farms but costs for the small farms were 17.2% above large farms. Because of the cost advantage of large farms, gross and net profit of these farms was 26.1% and 69.6% higher than small farms. Benefit-Cost Ratio is 1.84 and seems highly feasible. This ratio indicates that dairy farming in the region is economically efficient and beneficial. Moreover, the Benefit-Cost Ratio is increasing with the farm size. These results are similar to the results observed by MacDonald et al. (2007), Kumawat et al. (2014) and Datta et al. (2019). For example, MacDonald et al. (2007) found that the cost advantages of larger size allow large farms to be profitable, on average, even while most small farms were unable to earn enough to replace their capital. The profit of 1 liter of raw milk was found as 0.44 TL 0.60 TL , and 0.67 TL for first, second and the third group farms, respectively.

Table 10. The share of each cost types on total variable costs by farm size groups (%)

Çizelge 10. İşletme genişlik gruplarına göre her bir maliyet türünün toplam değişken maliyetlerdeki oranı (%)

Type of Costs	1st farm size group (5-14 head)	2nd farm size group (15-29 head)	3rd farm size group (30+ head)	Average
Feed costs	80.43	81.45	87.06	85.15
Barn cleaning	1.22	2.29	1.37	1.57
Milking costs	1.47	1.84	1.32	1.45
Veterinarian, medicine and vaccine	8.87	8.04	6.21	6.88
Artificial insemination	2.51	2.63	1.57	1.90
Heating, cooling and lighting	4.72	3.55	2.31	2.82
Costs of disinfection	0.78	0.21	0.15	0.23
Total variable expenses	100.00	100.00	100.00	100.00

Table 11. Average total income, total cost, gross and net profit per milking animal by farm size groups (TL/Head)

Çizelge 11. İşletme genişlik gruplarına göre ortalama gelir, maliyet, sağılan hayvan başına brüt ve net kar (TL/Baş)

Farm size groups	Total Revenue	Total Cost	Gross Profit	Net Profit	Benefit-Cost Ratio
1st Group (5-14 head)	7013.14	4731.25	3384.22	2281.89	1.48
2nd Group (15-29 head)	7257.09	3813.49	4021.36	3443.60	1.90
3rd Group (30+head)	7906.62	4036.23	4268.88	3870.39	1.96
Average	7421.21	4043.42	3885.27	3377.79	1.84
F-test	4.505*	3.808*	1.975	7.205*	4.557*
(P value)	(0.014)	(0.026)	(0.145)	(0.001)	(0.013)

\*: Statistically important at a 5% significance level.

## CONCLUSSION and RECOMENDATIONS

The main objective of this study was to determine the economic analysis of dairy cattle holdings. Turkey milk production is rapidly shifting to larger dairy farms. The results proved that the productivity and profitability of dairy farming are positively affected by the size of the dairy farm. Large dairy farms have substantial cost advantages over smaller ones. Large dairy farms in the region were much more likely to use new technologies to increase their income and profit. Results showed that large dairy farms had many advantages on milk yield, milk prices, and high production of feed planting, lower cost, higher return, and profit. Given this, production should continue to shift towards large dairy farms. It was determined that 92.20% of the farmers produced roughage itself. However, their production does not meet all their needs. It was observed that farmers with small-scale enterprises had difficulty in producing roughage because they did not have enough land. Farmers should be provided with rental land by the Provincial Directorates of Agriculture or they should provide quality feed supply at an affordable price. It should be noted that the feed inputs provided to small agricultural farms are of high quality and affordable prices so that the farmers will go to increase their livestock and grow their farms. Most of the producers apply different but unconscious rations to dairy cattle. Since feed cost constitutes the most expensive item of

a dairy farm, with the application of ration, feed costs decrease, and the yield per animal increases. In particular, all the farms dealing with dairy cattle breeding should be informed about the ration application by technical staff and the application should be ensured.

The higher the yield obtained from the unit animal, the higher the profit of the activity produced. For this reason, regular records should be kept for dairy cattle and these records should also be checked by the Breeding Union or Agricultural District Directorates. Cattle with higher productivity in regularly recorded cattle are transferred to the next generation, so that the yield can be increased. Moreover, in order to achieve high productivity at low cost in enterprises, ration application should be applied in feeding. The instability of coarse and concentrated feed prices, high prices and low milk prices put the animal enterprises in the region in a difficult situation. This instability in the market must be eliminated and the state should support the farmers in this regard.

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#### Researchers Contribution Rate Declaration Summary

The authors declare that they have contributed equally to the article.

#### Conflicts of Interest

Makale yazarları aralarında herhangi bir çıkar çatışması olmadığını beyan ederler.

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