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Cost of Milk and Marketing Margins in Dairy Farms of Turkey

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Abstract: The study is based on the cost of milk and marketing margins in dairy farms in Tokat-Turkey with the help of primary data collected randomly from 62 farmers. In the study it was determined that milk production in dairy farms was relatively profitable in domestic (1.34), cross-bred (1.29) and culture (1.58) dairy cattle. It was found that marketing margins of milk were 183.33% for domestic, cross-breed and culture dairy cattle. As a result, although there were some structural problems for dairy farms such as high input prices, lack of cooperation among producers and long marketing chains between producers and retailers, it can be still perceived that the dairy farming can be one of the most important income sources for the farmers of rural provinces of Tokat-Turkey. Furthermore it should be stated that current livestock policy need to be regulated.

Key words: Dairy cattle, marketing margins, milk cost, Turkey

INTRODUCTION

Agricultural production is a unitary including crop, livestock, fisheries and forestry productions and plays an important role in national economy, contributing about 30% of agricultural production value and 9% of the Gross National Product of the country (SPO, 2001). Dairy farming plays an indispensable role in the rural area and largely subsistence economy of Turkey and the landless and marginal small farmers largely depend on dairy farming for their survival (Uzunoç *et al.*, 2007).

The total cattle population in Turkey is estimated as 10 526 440 head in 2005. The share of the total cattle population in domestic, cross-bred and culture cattle are 2 354 957 head, 4 537 998 head, 3 633 485, respectively. Total amount of milk production is 10 064 260 tonnes to be milked from 4 036 302 head in 2005 (TSI, 2006). Tokat province has important role in dairy farming and several milk factories as DIMES, AYTAC and RESUT etc. The total cattle population in Tokat 230 000 head and the share of the total cattle population in domestic, cross-bred and culture cattle are 26 250 head, 84 372 head, 119 378, respectively in 2005 (Anonymous, 2006).

Marketing margin is defined as the price difference of the product between the price paid by consumer and received by producer (Dagdemir, 2000; Kaygısız, 2002; Topcu, 2004; Zulfiquar *et al.*, 2005; Carambas, 2005). In the dairy milk market, marketing margin is an important

issue and directly related to the income for farmers producing milk especially at the small scale farming.

Literature review shows that majority of the studies on dairy farming in Turkey are related to the economic analysis of dairy production. In recent years, many studies have been made on the economic analysis and policy of dairy production (Cetin and Koyuncu, 1991; Bulbul and Fidan, 1994; Karalar, 1994; Erkuş *et al.*, 1996; Ozen and Olug, 1996; Gul, 1998; Yavuz, 2000; Sahin, 2001; Yavuz *et al.*, 2001; Yilmaz *et al.*, 2003; Yildirim and Sahin, 2003; Yavuz *et al.*, 2004). However marketing margin studies on the dairy production is very limited. Therefore, there is a need for further study, especially on the milk marketing margin.

The aim of the study is to determine the cost of milk produced by the dairy farmers and to estimate marketing margins in Tokat province of Turkey. Also, the study is expected to provide meaningful parameters that would be of valuable use for the policy makers.

MATERIALS AND METHODS

Data were collected from 62 dairy farms in Tokat, Turkey by using a face-to-face questionnaire performed in 2003. Dairy farms were selected based on Random Sampling Method. The size of each sample was determined using in the following equation derived from Neyman Method (Yamane, 1967).

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$$n = \frac{\sum (N_h S_h)}{N^2 D^2 + \sum N_h S_h^2}$$

where, n is the required sample size; N is the number of dairy farms in target population; N_h is the number of the population in the h stratification; S_h is the Standard deviation in the h stratification, S_h² is the variance of h stratification; d is the precision where (x-x') z is the reliability coefficient (1.96 which represents the 95% reliability); D² = d²/z².

In the study, economical feed conversion ratio (New and Wijkstrom, 2002; Ellingsen and Aanonsen, 2006; Sayili *et al.*, 2007), production cost, total income, cost per unit of milk, net profit (Kiral *et al.*, 1999) and marketing margin were found and investigated for domestic, cross-bred and culture cattle.

RESULTS

The dispersion of the number of cattle for domestic, cross-bred and culture cattle is shown in Table 1.

Also it is seen that milk yields (kg dairy cattle⁻¹) for domestic, cross-bred and culture cattle are 1106.68, 2843.71 and 3180.35 kg dairy cattle⁻¹, respectively.

Table 1: The number of cattle (Head Farm⁻¹) and milk yield (kg dairy cattle⁻¹)

Cattle	Domestic (Head Farm ⁻¹)	Cross bred (Head Farm ⁻¹)	Culture (Head Farm ⁻¹)
Dairy cattle	3.63	3.56	4.79
Heifer	1.15	1.44	1.89
Young bull	1.15	2.38	1.47
Calf	2.96	3.57	4.32
Bull	0.04	0.00	0.11
Total	8.93	10.95	12.58
Production amount (kg farm ⁻¹)	4,017.26	10,123.63	15,233.89
Yield (kg dairy cattle ⁻¹)	1,106.68	2,843.71	3,180.35

Table 2: Production costs (\$ farm⁻¹)

Cost items	Domestic		Cross bred		Culture	
	Value (\$)	%	Value (\$)	%	Value (\$)	%
Variable cost						
Labour	281.09	19.75	763.05	20.28	780.76	17.66
Feed	683.10	47.99	1,862.87	49.51	2,250.61	50.89
Veterinary-Medicine	58.38	4.11	205.30	5.46	242.94	5.49
Mate	7.11	0.50	18.63	0.50	27.19	0.61
Salt-Disinfection	11.16	0.78	21.94	0.58	25.09	0.57
Lighting	11.04	0.78	11.59	0.30	21.26	0.48
Total (A)	1,051.88	73.91	2,883.38	76.63	3,347.85	75.70
Fixed cost						
Management (A*0.03)	31.56	2.22	86.50	2.30	100.44	2.27
Building capital depreciation	80.70	5.67	161.42	4.29	171.83	3.89
Building capital interest	147.58	10.37	356.17	9.47	420.88	9.52
Building repairing and maintenance	8.57	0.60	18.63	0.50	13.94	0.32
Dairy cattle depreciation	40.18	2.82	100.99	2.68	151.27	3.41
Dairy cattle capital interest	62.79	4.41	155.63	4.13	216.11	4.89
Total (B)	371.38	26.09	879.34	23.37	1,074.47	24.30
Production cost (A+B)	1,423.26	100.00	3,762.72	100.00	4,422.32	100.00
Production cost (\$ cattle ⁻¹)		159.38		343.63		351.54

1\$ = 1,51 NTL in 2003 (CBRT, 2003)

Feed cost has the biggest share in the production costs for domestic (47.99%), cross-bred (49.51%) and culture (50.89%) cattle groups. The second cost item is labour cost in the production costs for domestic (19.75%), cross-bred (20.28%) and culture (17.66%) cattle groups (Table 2).

It is found out that per cattle production cost for domestic cattle, cross-bred cattle and culture cattle is 159.38, 343.63 and 351.54 \$ cattle⁻¹, respectively.

Total income consists of milk sales, manure income, cattle sales and productive value change (PVC). It is calculated that per cattle production cost for domestic, cross-bred and culture cattle is 214.08, 443.91 and 553.28 \$ cattle⁻¹, respectively (Table 3).

In the study, the cost of milk was calculated and found out for domestic, cross-bred and culture cattle as 0.24, 0.25 and 0.20 \$ kg⁻¹, respectively, while sale price of milk was 0.30 \$ kg⁻¹ (Table 4).

It is seen that cost of milk was found out relatively high. This can be explain that the input prices especially feed is pretty high. Net profit was calculated for domestic, cross-bred and culture is 0.06, 0.05 and 0.10 \$ kg⁻¹, respectively (Table 4). Relatively high net profit of the culture cattle can be explained by the high milk yield productivity.

The feed conversion ratio (FCR) is a measure of feed efficiency that is used for all livestock production (New and Wijkstrom, 2002). Economical feed conversion ratio (EFCR) refers to pound of feed used for each pound of milk produced. It is seen that the highest EFCR is found for the culture cattle as 3.09 and 2.06 \$ means that 1 \$ of feed cost provides 3.09 \$ total income and 2.06 \$ milk income (Table 5).

Marketing margin of milk calculated for the domestic dairy cattle, cross-breed dairy cattle and culture dairy cattle are shown in Table 6 as 183.33%.

Table 3: Total income (\$ farm⁻¹)

Income items	Domestic	Cross-bred	Culture
Milk sales	1,197.21	3,016.95	4,646.96
Manure income	65.24	184.13	236.89
Cattle sales	391.23	1 005.80	1 123.86
PVC	258.03	653.97	952.56
Total income (\$ farm ⁻¹)	1,911.71	4,860.85	6,960.27
Total income (\$ cattle ⁻¹)	214.08	443.91	553.28

Table 4: Cost analysis of milk

Parameters	Domestic	Cross-bred	Culture
Total production cost (\$ farm ⁻¹) (2)	1,423.26	3,762.72	4,422.32
Manure income (\$ farm ⁻¹) (3)	65.24	184.13	236.89
Cattle sales (\$ farm ⁻¹) (4)	391.23	1005.80	1123.86
Total amount of milk (kg farm ⁻¹) (5)	4,017.26	1,0123.63	1,5233.89
Cost of milk (\$ kg ⁻¹) [(2-(3+4))/5]	0.24	0.25	0.20
Total income (\$) (1)	1,911.71	4,860.85	6,960.27
Relative profit (1/2)	1.34	1.29	1.58
Net profit (Sale price of milk*- Cost of milk) (\$ kg ⁻¹)	0.06	0.05	0.10

*Sale price of milk received by farmers is taken 0.30 \$ kg⁻¹

Table 5: Economical feed conversion ratio (EFCR)

Cattle	Feed cost (\$ farm ⁻¹) (1)	Total income (\$ farm ⁻¹) (2)	EFCR (2/1)
Domestic	683.10	1,911.71	2.80
Cross-bred	1,862.87	4,860.85	2.61
Culture	2,250.61	6,960.27	3.09

Cattle	Feed cost (\$ (1))	Milk income (\$ (2))	EFCR (2/1)
Domestic	683.10	1,197.21	1.75
Cross-bred	1,862.87	3,016.95	1.62
Culture	2,250.61	4,646.96	2.06

Table 6: Marketing margins of the milk

Marketing margins	Domestic, Cross-Bred, Culture
Sale price of milk (\$ kg ⁻¹) (A)	0.30
Retail price of milk* (\$ kg ⁻¹) (B)	0.85
Marketing margins (\$) (B-A)	0.55
Marketing margins (%)	183.33

*Retail price of milk received by consumers is taken 0.85 \$ kg⁻¹

While sale price of milk received by the farmers was 0.31 Euro kg⁻¹ and retail price of milk was 0.79 Euro kg⁻¹ in UK, sale price of milk received by the farmers was 0.27 Euro kg⁻¹ and retail price of milk was 0.27 Euro kg⁻¹ in Turkey. The ratio of the sale price of milk received by the farmers and retail price of milk price was found 2.54 in UK and 3.19 in Turkey (UTCA, 2005). This means that the price of milk received by the farmers is low and retail price of milk is high in Turkey compare to EU.

CONCLUSION

Turkey is called as agricultural country where dairy farming is an important issue and per capita milk consumption (25 kg) is three times lower than per capita meat consumption (79.2 kg) in EU countries.

Having several milk factories such as DIMES, AYTAC, RESUT etc., the research area where dairy farming has been widely produced has important

potential with its crop production pattern, fertilizer land, climate and wet beet sugar pulp produced by sugar-beet factory.

In the study, cost of milk and net profit for domestic, cross-bred and culture cattle are found 0.24, 1.34, 0.25, 1.29, 0.20 and 1.58 \$ kg⁻¹, respectively. While sale price of milk received by the farmers was 0.31 Euro kg⁻¹ and retail price of milk was 0.79 Euro kg⁻¹ in UK, sale price of milk received by the farmers was 0.27 Euro kg⁻¹ and retail price of milk was 0.27 Euro kg⁻¹ in Turkey. The ratio of the sale price of milk received by the farmers and retail price of milk price was found 2.54 in UK and 3.19 in Turkey. This means that the price of milk received by the farmers is low and retail price of milk is high in Turkey compare to EU.

In this study the producers could not get gain enough in dairy production. However it is determined that milk traders have made more profit (183.33%) than milk producers though producers undertook more risk than the traders. This can be explained by the fact that there is no cooperation among milk producers. At the same time some other reasons might be shown that the lack of profession, educational knowledge and financial weakness among milk producers and the imbalance between input costs, especially feed, live animal and milk prices.

In conclusion, it can be perceived that the dairy farming can be one of the most important income sources for the farmers of rural provinces of Tokat-Turkey if the marketing chains can be shortened between producers and retails and improved cooperation among producers. Besides, there is still a need livestock policy to be changed on the input prices.

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