RESEARCH ARTICLE

ECONOMIC PROFILE OF MILK PRODUCTION IN COIMBATORE

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ARTICLE INFO	ABSTRACT
	Dairy farming occupies a notable place in the agricultural economy of India and milk and milk products are the second largest contributor to Gross National Product (GNP) and income from dairy farming contributes nearly a third of the rural household's gross income. Tamil Nadu is one of the leading milk producing state in the country, the other states being Uttar Pradesh, Madhya Pradesh, Punjab, Rajasthan, Gujarat, Maharashtra, Andhra Pradesh and Hariyana. Paradoxically, however, the milk production in Tamil Nadu is witnessing a declining trend in recent years due to low productivity of the milch animals, which have been attributed to poor genetic status, non-availability of proper nutrition, poor quality of management and so forth. The rural producers are not only ignorant of the qualitative aspects of the enterprises but even unmindful of the production capabilities of their animals. The knowledge of the economics of milk production in the rural areas would be of immense help for planning for improving of dairy animals and in formulating policies for improving the profitability of the enterprise. The present study is, an attempt to compare the cost and returns of milk production across different farm groups and to analyse the resource – use efficiency of dairy enterprises in Coimbatore. The study was based on primary data which was compiled by administering a pretested interview schedule to 150 randomly selected dairy owners residing in Mayilampatty village in Coimbatore District. The data collected relate to the period January to December 2009. The respondents were classified into 3 groups (small farmer, medium farmer and large farmers) based on the size of the farms owned by them. The study would highlight the cost and returns of milk production. Cost function and the production function will be analysed. Added to this resource productivity and resource use efficiency will be handled.

INTRODUCTION

Dairy farming occupies a notable place in the agricultural economy of India and milk and milk products are the second largest contributor to Gross National Product (GNP) (Gaddi, *et al.,* 1996) and income from dairy farming contributes nearly a third of the rural household's gross income (Pankay *et al.,* 2005). Tamil Nadu is one of the leading milk producing state in the country, the other states being Uttar Pradesh, Madhya Pradesh, Punjab, Rajasthan, Gujarat, Maharashtra, Andhra Pradesh and Hariyana. Paradoxically, however, the milk production in Tamil Nadu is witnessing a declining trend in recent years due to low productivity of the milch animals, which have been attributed to poor genetic status, non-availability of proper nutrition, poor quality of management and so forth. The rural producers are not only ignorant of the qualitative aspects of the enterprises but even unmindful of the production capabilities of their animals.

The knowledge of the economics of milk production in the rural areas would be of immense help for planning for improving of dairy animals and in formulating policies for improving the profitability of the enterprise. The present study is, an attempt to compare the cost and returns of milk production across different farm groups and to analyse the resource – use efficiency of dairy enterprises in Coimbatore. The study was based on primary data which was compiled by administering a pretested interview schedule to 150 randomly selected dairy owners residing in Mayilampatty village in Coimbatore District. The questionnaire adopted helped the researcher to collect informations on social economic and many other related variables of dairy farming. The collected materials and data were organized arranged and tabulated and suitable tools were applied to arrive at results. The data collected relate to the period January to December 2009. The respondents were classified into 3 groups (small farmer, medium farmer and large farmers) based on the size of the farms owned by them.

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Table 1. Cost and returns of milk production

(in Rs. per animal per annum)

S.No.	Particulars	Small Farmers	Medium Farmers	Large Farmers
	Variable cost			
I	Green fodder	5988.24	6318.48	7100.04
II	Dry fodder	7723.08	7449.32	7855.56
III	Concentrates	5413.36	7297.12	8587.20
IV	Total feed cost (I + II + III)	19124.68	21064.92	23542.80
V	Human labour	2249.40	2972.16	3624.12
VI	Veterinary charges and transport	690.12	723.72	1591.04
A	Total variable cost (IV + V + VI)	22064.80	24760.8	28757.96
		(73.41)	(72.33)	(71.95)
	Fixed cost			
VII	Depreciation	7923.21	9394.25	11107.42
VIII	Interest on fixed cost	67.23	76.45	101.50
B	Total fixed cost (VII + VIII)	7990.44	9470.70	11208.92
		(26.59)	(27.67)	(28.05)
C	Gross cost (A + B)	30055.24	34231.50	39966.88
D	Gross income	35353.50	43314.6	54562.20
E	Net income (D – C)	5298.26	9083.1	14595.32
F	Benefit – cost ratio	1.18	1.27	1.37

Table 2. Regression co-efficient of cost function

S. No.	Type of farm	Regression Coefficient	R^2	Standard Error	't' value	F value
1	Small farmers	9.746	0.874	0.594	16.417	269.512*
2	Medium farmers	7.547	0.831	0.621	12.163*	147.933*
3	Large farmers	5.899	0.935	0.311	18.998*	360.933*

Note : *Significant at 1 percent level.

Table 3. Milk production function (of milk) for milch animals

S.No.	Variables	Small Farmers	Medium Farmers	Large Farmers
1	Constant	0.84	1.039	1.237
2	Green Fodder (X_1)	0.615*	0.618*	0.270*
		(7.499)	(7.381)	(2.258)
3	Dry Fodder (X_2)	0.221*	0.0187	0.661*
		(2.888)	(0.169)	(3.199)
4	Concentrates (X_3)	0.0402	0.0259	0.0429
		(1.328)	(0.506)	(0.825)
5	Human labour (X_4)	0.120	0.128	-0.319
		(2.047)	(0.728)	(-1.289)
6.	Veterinary charges (X_5)	-0.044	0.0148	0.0581
		(-1.9370)	(0.355)	(0.817)
7.	Coefficient of multiple determination (R^2)	0.928	0.879	0.86
8.	Adjusted	0.918	0.849	0.826
9.	F-Ratio	90.326	35.767	25.701

Note: *-Significant at 1% level; **-Significant at 5% level; Figures within parentheses are 't' values of regression coefficients

Table 4. Marginal value products of various factors affecting milk production

S.No.	Factors	Small Farmers	Medium Farmers	Large Farmers
1	Green fodder	0.9976*	1.1157*	0.4852*
		(3.1159)	(2.8556)	(12.2268)
2	Dry fodder	0.4087**	0.09699	1.2141*
		(2.5307)	(1.7216)	(46.1862)
3	Concentrates	0.2474*	0.1343**	0.2735*
		(4.8165)	(2.3838)	(3.9302)
4	Human labour	0.2581*	0.2633*	0.6421*
		(12.1967)	(12.1836)	(28.4195)

Note: *-Significant at 1% level; **-Significant at 5% level; Figures within parentheses are 't' values of regression coefficients

Cost and Returns of Milk Production

To analyze the costs and returns of milk production of different farm groups, the costs were classified into fixed expenses and variable expenses. Variable expenses included the expenses on green fodder, dry fodder concentrates, human labour, veterinary and other expenses. The items considered for fixed expenses were depreciation (at 10 percent per annum and 5 percent of kutcha sheds) and interest on fixed assets (at 12.5 percent per annum). Gross cost was computed by adding total variable cost and total fixed cost. Results of cost and returns analysis of milk production are presented in Table 1. The fixed cost component shared about 26 to 28 percent of the gross cost and depreciation formed the largest component of the fixed cost in all farm groups. The analysis further revealed that the net returns was positive for all farm size groups indicating that dairy farming was a profitable occupation. By and large, the net income increased with an increase in farm size with large farmers earning a maximum net income of Rs.14,595.32 per animal per annum, followed by medium

farmers (Rs.9083.1) and small farmers (Rs.5298.26). The benefit – cost ratio was also higher for large farmers (1.37) followed by medium (1.27) and small (1.18) farmers. A better utilization of the resources / inputs by the farm groups would help them to enhance further the returns from dairy farming.

Cost Function

A linear cost function of the form

$$C_i = b_0 + b_1 X_1 + U_1$$

Where C_i = Cost per milch animal in rupees per day

X_i = Quantity of milk produced in litres per animal per day

b_0 = Intercept

b_1 = Regression coefficient

U_1 = Random term

was fitted to the data to study the interrelationship between cost of maintaining the milch animal per day and yield per day. The result of the analysis is shown in Table 2. The estimated results indicate that the cost of maintaining milch animal was influenced by the quantity of milk produced per day for all farm households. The extent of variation in the maintenance cost explained by the independent variables (milk produced per day) varied from a high level of 93.5 percent for large farmers to a low level of 83 percent for medium farmers. For all farm groups, the quantity of milk produced had a positive impact on the maintenance cost (i.e) one percent increase in milk produced would bring about an increase in the cost of maintaining the milch by 9.746 units for small farmers, 7.547 units for medium farmers and 5.899 units for large farmers. Thus, the maintenance cost of milch animals increased with the increase in milk yield and this increase was higher for smaller farmers and lesser for large farmers.

Production Function Analysis

Production function was used to find out the input-output relationship; marginal value productivity of inputs used and also examine the resource – use efficiency in milk production in different farm groups. The multiple regression analysis in the form of Cobb Douglas was done to study the relative importance of various determinants of milk production in different size of farming and the results are given in Table 3. The results exhibits that the value of coefficient of multiple determination (R^2) was 0.928, 0.873 and 0.86 for small, medium and larger farmers respectively. This indicated that 86 to 93 percent of the variations in the value of milk production in different farm groups were explained by the independent variables. The co-efficient of green fodder was positive and significant for all farm groups (ie) there would be an increase of 0.615, 0.618 and 0.270 percent in the value of milk production with one percent increase in green fodder in dairy farms of small, medium and large farmers respectively. The regression coefficient of dry fodder was positive and significant for small and large farmers (ie) one percent increase in dry fodder would increase the value of milk production with one percent respectively in dairy farms of small and large farms. However, this coefficient of concentrates and veterinary charges was found to be insignificant for all farm size groups.

The regression coefficient of labour was found to be positive and significant for small farmers at four percent level while it was insignificant for medium and large farmers. An overview of the table 3 indicates that for small farmers, expenditure on green fodder alone emerged as a significant impact on milk production, while for medium farmers, the expenses on green fodder and dry fodder emerged as significant factors explaining variation in milk production. The concentrates, an important dairy input, turned out to be significant factor in explaining the variations in milk production in all farm groups. This may be probably due to the insignificant variations in feeding of this input to the animals by the farmers in the study area.

Resource Productivity and Resource Use Efficiency

In order to test the resource use efficiency in dairy units, marginal value productivity (MVP) of green fodder, dry fodder, concentrates and human labour were computed at the geometric mean level and they were compared with their respective factor costs, which is taken to be unity. If the ratio is one, it suggests that the resource is being used optimally. A greater than one ratio indicates that there is a possibility of increasing the resource under consideration both to increase productivity and profitability. A ratio less than one indicate that the resource could be reduced without any detrimental effect on production and productivity. The details regarding the marginal value products (MVP) of different inputs with the corresponding 't' values for different size groups of farms are presented in Table 4. A perusal of Table 4 reveals that there had been inefficiencies in the utilization of resources by all farm groups irrespective of their sizes. The MVPs of green fodder, dry fodder, concentrates and human labour were less than one for small farmers indicating over-utilization of these inputs by small farmers. The strong desire to increase milk yield coupled with lack of knowledge may have forced the small farmers to overfeed their animals. Thus by reducing the use of all inputs the small farmers could increase the milk production in their dairy units. For medium farmers while MVP of green fodder was greater than one indicating under utilization of this inputs, the MVP of dry fodder, concentrates and human labour was less than one implying over – utilization of these inputs. Thus for this group of farmers, yield of milk could be increased by reducing the use of dry fodder, concentrates and human labour and increasing the use of green fodder. With regard to large farmers, the MVP of dry fodder was greater than one indicating under utilization while the MVP of green fodder, concentrates and human labour was less than one indicating over – utilization. Hence by reducing the use of green fodder, concentrates and human labour and increasing the use of dry fodder, the large farmers could increase their milk yield. By achieving a higher yield of milk per day would help them to enhance the profitability of dairy farming.

Incidental Findings

Consumption and Disposal Pattern of Milk

❑ Both own consumption and marketed surplus of milk increased with increase in farm size. The average quantity consumed (1.59 litres per day) and average quantity marketed (26.93 litres per day) was

maximum for large farms and least for small farms (1.24 litres and 16.32 litres per day respectively).

❑ All the dairy owners preferred to market around 46 to 50 percent of their product by themselves and of the remaining surplus the large farmers preferred to sell it through cooperative societies while small and medium farmers preferred to sell it to private agencies.

❑ The average price received per litre of milk showed significant variations across the groups, with small farmers receiving a maximum price of Rs.11.67 per litre, followed by medium farmers (Rs.11.33 per litre) and large farmers (Rs.11 per litre).

❑ Besides income from the sale of milk, the farmers were also able to make some returns from the sale of dung and livestock. For all farm groups, 55 to 61 percent of income came from the sale of livestock. While the large farmers earned a higher total returns from the sale of dung (Rs.2310.96 per annum), the small farmers earned maximum returns from the sale of young livestock.

Opinions and Attitudes of Dairy Owners

• The major problem cited by small farmers in running a dairy enterprise was 'unremunerative price of milk' while for medium and large farmers it was 'diseases'. The other problems cited were 'non-availability of grazing land', 'high cost of feed and fodder' and so forth.

• The Kruskal – Wallis H test applied to find whether the farmers differed in their opinions on the problems of dairy enterprises revealed a calculated value of 0.072 which was less than the theoretical value of 5.99. Thus, farmers did not differ in their ranking of the constraints in running a dairy farms.

• More than $3/4^{th}$ of the farm households in medium and large farms did not favour any interventions from the government, while about 42% of the small farm household wanted government intervention.

• The major help sought by all the respondents was the extensions of credit facilities at reasonable rates of interest.

Conclusion

From the above discussion it is evident that dairy farming formed a vital subsidiary occupation for milk producers of Mayilampatty village in Coimbatore district.

The above analysis revealed that the net returns was positive for all farm size groups indicating that dairy farming was a profitable occupation and better utilization of the resources / inputs by the farm groups would help them to enhance further the returns from dairy farming and the quantity of milk produced had a positive impact on the maintenance cost. Moreover, despite the inefficiencies in the utilization of the resources / inputs, milk production emerged to be profitable enterprise for all farmers. The major problem cited by the respondents in operating a dairy unit was lower prices for milk, prevalence of diseases, high cost of feed and fodder and non-availability of grazing land.

Recommendations

• To ensure fair prices to producers, effective-steps should be taken to revise milk procurement price by taking into account the cost variations and seasons.

• Effective steps must be taken to ensure free supply of medical and technical assistance, vaccines and medicines to improve the general health conditions of the animals.

• There is a need to make greater efforts to educate the farmers in respect of latest breeding, feeding and animal management technique.

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