



Cost and Returns of Milk Production Under Different Types of Dairy Farms in Kerala

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Received: 29 Sept., 2021

Revised: 12 Nov., 2021

Accepted: 16 Nov., 2021

ABSTRACT

The present study was carried out to study the cost and returns of milk production among different types of dairy farms in Kerala. A stratified multistage random sampling procedure was used to select the area of study and respondents. The farmers/farm households were categorized into small or subsistence farms (1-2 cows), medium (3-10 cows), and large farms (more than ten cows). The gross cost per milk animal per day was ₹ 229.81, ₹ 203.04, ₹ 249.51 and ₹ 226.38 in small, medium and large farms respectively. The net return from milk animal/day was ₹ 44.46, ₹ 45.31, ₹ 62.02 and ₹ 48.46 in small, medium, large and overall farms respectively. The net return after deduction of imputed cost was ₹ 110.36, ₹ 81.9, ₹ 70.12, and ₹ 93.61 respectively. The net return per day per milch animal was ₹ 23.34, ₹ 10.39, ₹ 27.74 and ₹ 20.58 respectively in small, medium, large and overall farms respectively. The net return after deduction of imputed family labour cost was ₹ 92.59, ₹ 52.42, ₹ 43.12 and ₹ 70.51 in small, medium, large and overall farms respectively. The cost after deduction of imputed labour was much better and was lower in small farms signalling the major contribution of family labour in small farms. Since the cost of concentrate feed constituted the major share of the production cost of milk, strategies for better scientific feeding of dairy cattle and support from government is to be included in the planning of projects.

HIGHLIGHTS

- The cost after deduction of imputed labour was much better and was lower in small farms signalling the major contribution of family labour in small farms
- The net return from milk animal/day was ₹ 44.46, ₹ 45.31 and ₹ 62.02 in small, medium, large farms respectively.

Keywords: Dairy Economics, Crossbred Cattle, Cost and returns, Milk Production

India has emerged as the largest producer and consumer of dairy products in the world. India has retained the status of highest milk producer in the world, since 2006 with the annual milk production of 187.7 million tonnes, and a per capita availability of 374 gram/day in 2018. The value contributed by dairy sector to total agricultural output is also higher than other products including rice (Samal *et al.*, 2014). Milk is the ultimate output having economic significance, which brings returns to the milk producer. The cost and returns in dairy enterprise are important concern for milk producers, consumers and

policy makers to provide an effective linkage among them to make rational decisions. Cost of milk production often becomes a policy issue, when milk producers complain that the price of milk they receive barely covers the cost of production. Hence, estimation of the cost and returns of

How to cite this article: George, S., Saseendran, P.C., Anil, K.S., Gleeja, V.L., Benjamin, E.D., Pramod, S. and Muhammad Aslam, M.K. (2021). Cost and Returns of Milk Production Under Different Types of Dairy Farms in Kerala. *J. Anim. Res.*, **11**(06): 1105-1109.

Source of Support: None; **Conflict of Interest:** None 

milk production acts as an important economic indicator for assessing the level of profit of dairy enterprise at the producers' level. But there were only few studies which reported the cost of production and returns earned by dairy farmers of Kerala. Keeping the above background in mind, the present study was conducted in the state of Kerala with a specific objective to compare the cost and return of milk production among different types of farms *viz.* small, medium and large dairy farms.

MATERIALS AND METHODS

Dairy farmers, who were members of dairy co-operatives and were enrolled in the Direct Benefit Transfer (DBT) scheme of the Government of Kerala were selected for the study. There were about two lakhs dairy farmers in Kerala who were members of DBT schemes. Therefore a total sample size of 350 farmers was selected for the study. The farmers/farm households were categorized into small or subsistence farms (1-3 cows), medium farms (4-10 cows), and large farms (more than 10 cows) (KAU, 2010). Out of the 350 farmers selected for the study, the numbers of small, medium and large farms were fixed as 175, 100, and 75 respectively. A stratified multistage random sampling procedure was used to select the area of study and respondents. In the first stage, the state of Kerala was stratified into five agro-climatic zones (NARP, 1989). In the second stage, one district from each zone (strata) was randomly selected. In the third stage, from each district two blocks were randomly selected.

The sample size for each category of farms in each block was determined in proportion to the number of farmers belonging to each category (probability proportion to size technique). For this, all the farmers in the selected blocks were enumerated and classified into small, medium, and large farms based on number of cows. The respondents in each group were chosen randomly in each block, proportional to their number in each block. Primary data were collected by means of observation, in-depth interview, and questionnaires. In order to accomplish the objectives of the study, the data collected from the milk producers were scrutinized, tabulated and analyzed utilizing various analytical tools. Tabular analysis was applied to work out the costs and returns from milk production. The total costs involved in milk production comprise fixed costs and variable costs.

Investment pattern

The income-generating capacity of a dairy owner was reflected through the investment pattern. The fixed investment in the farm was considered for this study which included:

1. Investment for milch animals.
2. Investment for farm buildings.
3. Investment for machinery and equipments.

The proportionate investment on the above items was worked out separately for various categories of the farm.

Costs and returns concepts

The maintenance cost of animals and returns were calculated per milk animal as well as per milch animal, per day basis (milch animals = milk plus dry animals).

Fixed cost

It is the expenditure incurred whether or not the production is carried out. It included interest on fixed capital and depreciation, and was calculated based on standard animal units. The components of fixed cost were interest on fixed capital investment (12% annually) and depreciation on fixed capital. The depreciation on fixed capital comprised of depreciation on milch animals @ 12.5% and depreciation on cattle shed and equipment. The depreciation on cattle shed was calculated by the type of building, taking into consideration, their foundation, superstructure, and roof. Based on this, the value and productive life of the buildings were estimated for calculation of depreciation. The buildings were classified into five types with depreciation of 3, 5, 10, 20 and 30 percent. The depreciation on equipments was estimated at 10 percent level.

Variable cost

Variable costs included the costs which were incurred on the variable factors of production and can be altered in the short run. It includes feed cost, labour cost, veterinary cost, and insurance cost.

- i. **Cost of feed & fodder:** It included the cost of feed materials like concentrates, green fodder, and hay/straw consumed by the animals.

- ii. Labour cost:** It was estimated including the family and paid labour costs. The hired labour was calculated on the basis of actual cost incurred. In case of family labour, the imputed value obtained depended upon the time spend in dairying and wage rates as fixed by minimum wages fixed by the Government of Kerala. The labour cost was apportioned on a standard animal unit basis.
- iii. Veterinary cost:** It was estimated taking in to consideration the various costs incurred for breeding, vaccination, medicines, and professional charges.
- iv. Insurance cost:** For all milch animals @ premium rate of 3 percent per annum.

Gross cost

The gross cost was calculated by the addition of all variable costs and total fixed costs.

$$\text{Gross cost} = \text{Total fixed cost} + \text{Total variable cost}$$

Net cost

For the calculation of net cost, the imputed value of dung was deducted from the gross cost (@ ₹ 0.9/Kg).

$$\text{Net cost} = \text{Gross cost} - \text{Imputed value of dung}$$

Gross returns

Gross returns were obtained by multiplying wet average with average price obtained from the milk cooperative society. i.e.

$$\text{Gross returns} = \text{Quantity of milk} \times \text{Average price from society}$$

Net returns

Net return was calculated by subtracting net cost from gross return i.e.

$$\text{Net returns} = \text{Gross returns} - \text{Net cost}$$

The cost and returns were calculated on per day per milk animal (animals in milk) as well as milch animal (milking plus dry animals) basis. The cost and returns after deduction of imputed value of family labour was also calculated.

RESULTS AND DISCUSSION

The details of cost and returns from milk production per day per milk animal basis and proportion of cost parameters to gross cost are presented in Table 1. The gross cost per milk animal per day was ₹ 229.81, ₹ 203.04 and ₹ 249.51 in small, medium and large farms respectively. The respective net return from milk animal/day was ₹ 44.46, ₹ 45.31 and ₹ 62.02. The net return after deduction of imputed cost of family labour was ₹ 110.36, ₹ 81.9 and ₹ 70.12 respectively. The proportion of total fixed cost was 15.81, 16.51 and 21.77 per cent of the total gross cost per milk animal per day. The total variable cost contributed 84.19, 81.31 and 79.96 per cent of gross cost in small, medium and large farm sizes. In all farms, total feed cost was the major contributor to the total variable cost and the cost of concentrate feed accounted the major share in the total feed cost. In small farms family labour was an important component in determining the cost and returns from dairying.

The cost increased and returns diminished when the expenses incurred on dry animals were also considered. The cost and returns per day per milch animal and the proportion to gross cost is presented in Table 2. The net return per day per milch animal was ₹ 23.34, ₹ 10.39 and ₹ 27.74 respectively in small, medium, large and overall farms respectively. The net return after deduction of imputed family labour cost was ₹ 92.59, ₹ 52.42 and ₹ 43.12 in the respective farms. The contribution of total fixed cost was 16.08, 19.15 and 22.78 per cent of gross cost in small, medium, large and overall farms respectively. The proportion of total variable cost was 83.92, 90.55, and 77.22 of gross cost in different types of farms.

Similar studies were reported from the states of Tamil Nadu (Kumar *et al.*, 2002), Andhra Pradesh (Lakshmi Priya and Raju, 2019) and Maharashtra (Jadhav *et al.*, 2020) in south and west India. Important studies reported from north India were by Kumavat *et al.* (2014) and Satashia and Pundir (2021) from Rajasthan and Gujarat respectively. Most of these studies used similar methodology. However the studies could not be compared due to differences in time period, variations in nutrition and management. Comprehensive studies on economics of milk production under different farm sizes in Kerala were also limited in number. As per Unnithan *et al.* (2010), the average gross cost of production of milk in the state of Kerala was

**Table 1:** Cost and Returns of milk production per milk animal per day under different farm sizes

Cost/Return Parameter (₹)	Small farm		Medium farm		Large farm	
Interest on fixed capital investment	21.06	(29.26)	21.20	(29.45)	29.72	(41.29)
Depreciation on fixed capital	15.28	(29.20)	16.74	(32.00)	20.30	(38.80)
Total fixed cost*	36.34	(29.24)	37.94	(30.52)	50.02	(40.24)
Green fodder cost	35.28	(32.65)	25.45	(23.55)	47.32	(43.79)
Dry fodder cost	5.91	(29.95)	8.58	(43.49)	5.24	(26.56)
Total roughage cost	41.18	(32.23)	34.03	(26.63)	52.56	(41.14)
Concentrate cost	105.30	(35.05)	87.88	(29.25)	107.23	(35.69)
Total feed cost	146.49	(34.21)	121.91	(28.47)	159.80	(37.32)
Medicine and veterinary care	3.75	(32.98)	3.75	(32.98)	3.87	(34.04)
Labour cost	39.97	(37.13)	35.97	(33.41)	31.71	(29.46)
Insurance	3.26	(30.02)	3.48	(32.04)	4.12	(37.94)
Total variable cost*	193.47	(34.67)	165.10	(29.58)	199.50	(35.75)
Total variable cost after deduction of imputed cost of family labour	127.57	(28.51)	128.51	(28.72)	191.40	(42.77)
Gross cost	229.81		203.04		249.51	
Gross cost after deduction of imputed cost of family labour	163.91		166.45		241.42	
Net cost	217.81		191.04		237.51	
Net cost after deduction of imputed cost of family labour	151.91		154.45		229.42	
Gross return	262.27		236.34		299.53	
Net returns	44.46		45.31		62.02	
Net Return after deduction of imputed cost of family labour	110.36		81.90		70.12	

*Figures in parenthesis is the proportion to gross cost in percentage.

Table 2: Costs and returns of milk production per milch animal per day under different farm sizes

Cost / Return parameter (₹)	Small farms		Medium farms		Large farms	
Interest on fixed capital investment	21.07	(29.27)	21.20	(29.45)	29.72	(41.28)
Depreciation on fixed capital	15.28	(29.20)	16.74	(32.00)	20.30	(38.80)
Total fixed cost*	36.35	(29.24)	37.94	(30.52)	50.02	(40.24)
Green fodder cost	35.28	(40.35)	25.49	(29.15)	26.66	(30.49)
Dry fodder cost	5.91	(29.95)	8.58	(43.49)	5.24	(26.56)
Total roughage cost	41.18	(38.43)	34.07	(31.80)	31.90	(29.77)
Concentrate cost	98.15	(36.50)	78.42	(29.16)	92.33	(34.34)
Total feed cost	139.33	(37.05)	112.49	(29.91)	124.22	(33.03)
Medicine and veterinary care	3.76	(33.04)	3.75	(32.95)	3.87	(34.01)
Labour cost	43.32	(35.75)	40.48	(33.41)	37.37	(30.84)
Insurance	3.26	(30.02)	3.48	(32.04)	4.12	(37.94)
Total variable cost*	189.66	(36.51)	160.20	(30.84)	169.58	(32.65)
Total variable cost after deduction of imputed cost of family labour	120.41	(30.66)	118.17	(30.08)	154.21	(39.26)
Gross cost	226.01		198.14		219.60	
Gross cost after deduction of imputed cost of family labour	156.76		156.11		204.22	
Net cost	214.01		186.14		207.60	
Net cost after deduction of imputed cost of family labour	144.76		144.11		192.22	
Gross return	237.35		196.53		235.34	
Net returns	23.34		10.39		27.74	
Net Return after deduction of imputed cost of family labour	92.59		52.42		43.12	

*Figures in parenthesis is the proportion to gross cost in percentage.

₹ 26.75. They also reported that the corresponding net cost of production cost was ₹ 26.27. It was also reported that nearly 48 percent of the overall cost was on feeding, 32 percent on labour, 12 percent on maintenance of dry cows, and loss in value of cows comprised the remaining 8 percent. The study also identified variation in cost among farms with different herd size. The net cost of production was ₹ 29.65 and 18.88 among single cow holder and medium-sized farms owning ten or more cows, respectively. The results of the present study also indicated that the average cost of production of milk in the state of Kerala was very high, and the milk price has to be adjusted accordingly so that dairy farming becomes a lucrative livelihood opportunity for poor farmers. The cost after deduction of imputed labour was much better and was lower in small farms signalling the major contribution of family labour in small farms. Since the cost of concentrate feed constituted the major share of the production cost of milk, strategies for better scientific feeding of dairy cattle and support from government by controlling price of concentrate feed is to be included in the planning of projects.

CONCLUSION

The results of the present study on cost and returns of milk production showed that the cost of milk production per litre of milk per milk animal with imputed family labour was lower in large farms. It was almost equal in small and medium farms. All these values indicated that they are almost close to the price realized from the society. The cost after deduction of imputed labour was much better and was lower in small farms signalling the major contribution of family labour in small farms. It could be concluded that the margin or return obtained from milk production is only valuable to the level of their labour value.

ACKNOWLEDGEMENTS

Support from Animal Husbandry & Dairy Development Department, Government of Kerala is gratefully acknowledged.

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