

ECONOMICS OF MILK PRODUCTION : A CASE STUDY OF AJMER DISTRICT CO-OPERATIVE MILK PRODUCERS' UNION

SHIV RAJ SINGH, S.M . FEROZE¹, K.K. DATTA² AND RAVI KANT GUPTA³
Department of Dairy Economics Statistics and Management, NDRI, Karnal
e-mail : shivagritech2007@gmail.com

(Received: 11.11.2011, Accepted 04.03.2013)

ABSTRACT

The present study was taken up to study the socio-economic conditions of the milk producers and to work out the seasonal cost and returns from milk production in the milk shed area of Ajmer District Co-operative Milk Producers' Union. The study was based on 312 milk producing households (comprising 104 in each season) comprising of 60 small, 31 medium and 13 large households which were selected randomly from two societies i.e. Jethana and Bandarsendri with probability proportional to size of herd in each category. In the study area dairy farming was main occupation of about 12 percent farmers. The average herd size is 4.92 milch animals which comprises of 2.64 buffaloes, 1.61 local cow and 0.67 for crossbred cows. The per day maintenance cost of milch buffalo was found to be higher (Rs. 69.42) in comparison to crossbred cows (Rs. 56.81) and local cows (Rs. 55.21). The maintenance cost varied in different seasons and found to be the highest in winter season and lowest in rainy season for all types of animals. By and large, variable cost constituted 86.74 percent in buffalo, 91.61 percent for local cows and 88.9 percent in crossbreds. The cost per litre of milk production in buffalo was Rs. 14.99, 10.20, 13.09 and 12.76 for summer, rainy, winter and overall respectively. In crossbred cow, the cost per litre of milk production for summer, rainy, winter and overall was found to be Rs. 111.02, 8.37, 10.24 and 9.86, respectively while in local cow the corresponding cost was 13.25, 8.16, 12.41 and 11.27. Net return per litre of was Rs. 0.12, 1.90, 0.12 and 0.73 for summer, rainy, winter and overall in crossbred cow, respectively. This net return was more in buffalo, where it was Rs. 3.56, 7.38, 6.06 and 5.67 for summer, rainy, winter and overall, whereas in local cow per litre net return was Rs. 0.39, 4.38, 1.41 and 1.80 for summer, rainy, winter and overall respectively. In the study area, the highest milk price was paid for buffalo followed by local cow and crossbred cow.

Key words : Cost of milk production, Dairy Co-operative, Economics, Ajmer.

One of the problem of liberalization in India is that our economic reforms have mainly benefited the 30 percent who live in urban areas. Much of the rural economy is still awaiting its share of liberalization. One way to remove this imbalance is through co-operative. Dairy co-operatives account for the major share of processed liquid milk marketed in the country. Milk is processed and marketed by 170 Milk Producers' Co-operative Unions, which federate into 15 State Co-operative

Milk Marketing Federations. The success story of dairy development in India can be further strengthened if suitable pricing policy is made favourable to the nearly 70 million rural milk producers who are not getting any type of incentives and subsidies. Thus, pricing of milk must prove to be an instrument through which the producer recovers his cost and makes profit.

After successful initiation of Dairy Co-operative Society, the dairying has become an organized enterprise. Though dairying is a subsidiary unit of agriculture and utilizes mainly its by-products, most of milk producers have begun to purchase input from market because of dairy practices. So, the producers are now very eager to know whether the returns from dairying are as expected? Cost of milk production is an important tool for the economic evaluation of dairy enterprise

1 Ph.D Scholar,

2 Assistant Professor (Economics), School of Social Sciences, College of Post Graduate Studies, CAU, Umiam.

3 Head (Principal Scientist),

4 Ph. D Scholar, Department of Livestock Production and Management, NDRI, Karnal

at producer's level and fixing the procurement price at District Co-operative Society level.

Traditional, dairying is a subsidiary occupation rearing only few milch animals depending on agricultural waste. But now a days, dairy sector is getting commercialized and subsidiary occupation is being the main occupation specially in the dryland/semi-arid region because crops frequently fail due to the irregular rains. Moreover, the problem is much worse due to lack of grazing land. Farmers have to purchase green fodder and dry fodder in summer season and concentrates almost throughout the year. Cost of milk production is increasing over time.

The high cost of milk production in India, inspite of its large cattle population is a paradox. Past studies on cost of milk production in different parts of India revealed that cost of milk production under the existing rural conditions is high, providing only marginal gains and feed cost alone accounted for the largest cost component, which ranged between 60-70 percent of the total cost of production (Ds 2004; Durai 2002; Desai 2005; Kumar 2003; Kumar and Pandian 2003; Singh 2001; Singh 2005; Singh 2006). Keeping all this study was undertaken with the objective of working out the cost and returns of milk production for Milk Producers' Co-operative Societies (MPCS) under Ajmer District Co-operative Milk Producer's Union.

MATERIALS AND METHODS

Sampling Plan and Data

Ajmer district was selected purposively for the

study mainly due to the presence having a large numbers (597) of MPCS under Ajmer District Co-operative Milk Producers' Union and infrastructural facilities for veterinary and animal husbandry services was also good. Moreover, no such study has so far been found to be conducted in this district. Out of 597 MPCS namely Jethana and Bandarsendri were selected randomly. After complete enumeration of all the milk producers cum suppliers of these two societies they were classified, using cumulative frequency square root method, into three categories viz. small (1-4 animals), medium (5-8 animals), large (≥ 9 animals) based upon the number of milch animals in the herd. A sample of 312 milk producing households (comprising 104 in each season) comprising of 60 small, 31 medium and 13 large household was selected randomly from these two societies with probability proportional to size of herd in each category.

The primary data were collected from the sample households using well structured schedule through personal interview for three seasons i.e. summer, rainy, winter.

Cost and return analysis

The cost and return structures were worked out by using following formula.

1. Gross Cost = Total Variable Cost + Total Fixed Cost.

a) Fixed Cost (FC) : It includes interest on fixed capital and depreciation. The fixed cost was apportioned on the basis of Standard ANimkal Units. The Conversion co-efficient used for apportioning the fixed costs are as follows:

| Types of Animal | Conversion factor | Types of animal | Conversion factor |
|--------------------------------|---------------------|--------------------------|-------------------|
| Adult Crossbred Cattle (milch) | 1.4 | Working Bovine | 1.00 |
| Milch Buffalo | 1.25 | Young Stock above 1 year | 0.50 |
| Heifer 0.75 | Young stock below 1 | 0.33 | |
| Local Cattle (milch) | 1.00 | | |

The interest on fixed capital was worked out at the prevailing rate (8%). The depreciation on milch animals was calculated by straight line method. The rates of depreciation were as follows:

| Types of Animal | Description | Productive life (years) |
|-----------------|-------------|-------------------------|
| CB Cows | 8 | 12.5 |
| Local Cows | 10 | 10 |
| Buffaloes | 10 | 10 |

Depreciations on cattle shed, stores and dairy equipments were be calculated by using straight line method. The rates of depreciation were as follows:

Economics of milk production

| Particulars | Percentage | Particulars | Percentage |
|-----------------|------------|-----------------------|------------|
| Puccca Building | 2 | Chaff cutter (manual) | 10 |
| Kutch building | 5 | Milk can | 20 |
| Bullock cart | 10 | Feed Manager | 20 |

b) **Varibale Cost** : It includes feed cost, labour cost, veterinary cost and miscellaneous cost.

i) **Feed and fodder cost** : Cost on green fodder, dry fodder and concentrate were worked out by multiplying quantities of feeds and fodders with their respective prevailing prices in the study area.

ii) **Labour cost** : It included cost of family as well as hired labour. The cost of hired labour was calculated considering wages paid. In case of family labour, the imputed value obtained depends upon the time spend in dirming and prevailing wage rate of casual labour in the study area.

iii) **Veterinary cost** : It included the cost of breeding for Artificial Insemination (A.I) or service charge of bull as well as cost of vaccination and medicines.

(iv) **Miscellaneous Cost** : It included the cost of repair, electricity, water charges, purchase of milk can, bucket, rope, etc. They were calculated on the basis of per milch animals per day for different types of milch animals kept by the sample households. Interest on working capital was not calculated as income from sale of milk was regular.

2. Net Cost = Gross Cost - Value of dung.

3. **Cost per litre of milk production:** To estimate the cost per litre of milk, the average net maintenance cost per household per day was divided by average milk production per household per day i.e.

$$\text{Cost per litre (Rs.)} = \frac{\text{Net Cost per household}}{\text{Total milk produced per household}}$$

4. Gross Returns = Quantity of milk X society price of milk

5. Net returns = Gross Returns - Net Cost

RESULTS AND DISCUSSION

In the light of the objectives set forth for the study, the data collected from the selected respondents were analyzed. The findings of the study have been presented and discussed, in this chapter, under the following sections:

Socio-economic Profile of Sample Households

The socio-economic profile of sample household is a prerequisite to have a sound impact on the decision making process and thereby influences profitability of dairy enterprise (Table 1). The average size of operational land holding in the study area was 7.85 ha varying from 3.98 ha. (small farmers) to 18.54 ha. (large farmers). the overall average family size for all sample households was 7.67. The standard of education moulds the farmer's response to improved technology and market performance. This is especially true in dairy farming which warrants a better quality of management inputs.

About 52 percent of head's of household were found literate. The main occupation was agriculture (61.53%) followed by services (16.34%) and dairy farming (12.52% and other 9.61%). The overall average milch animals per household were found to be 4.92.

Investment Pattern

Investment on dairy assets comprising of the by different categories of sample household is given in Table 2. The share of milch animal was highest in total investment in dairying across all categories of households followed by investment in cattle shed and stores. The average value of milch animals was observed to be highest for large farmers followed by medium farmers and small farmers.

Similar trend was observed in case of investment in cattle shed and stores.

Average Milk Yield

Milk yield brings return to the milk producers in dairy enterprise. The average daily milk yield per milch animal in different seasons is presented in Table 3. The average daily milk yield was higher for milch buffalo as compared to milch local cow but lower than milch crossbred cow. Average milk yield per day for all milch animals were highest in winter season followed by rainy season and summer season.

Cost of Milk Production

The knowledge of cost of milk production has an important impact in the decision making process of the milk producers, as it acquaints them about the profitability from dairy enterprise. Moreover, it is useful for the policy makers to frame policies towards development of the dairy sector. The cost of milk production from different type of milch animals was worked out separately in different seasons for selected sample households.

Maintenance Cost of Milch Animals

To work out the per litre cost of milk production for milch the first and foremost need is to estimate the per maintenance cost. The per day maintenance cost of animals in different seasons are presented in Table 4. The per day maintenance cost of milch buffalo was highest (Rs. 69.42) in comparison to crossbred cows (Rs. 56.81) and local cows (Rs. 55.21). The maintenance cost varied in different seasons and found to be the highest in winter season and lowest in rainy season for all types of animals. In the total maintenance cost per day the variable costs had the maximum share ranging from 86.74% in buffalo to and 91.61% for local cows and 88.98% in case of crossbreds.

Among the variable costs feed and fodder is the most important component with its share of 63.95% in case of buffalo, 63.65% in case of crossbreds and 69.43% in case of local cows. The total feed cost per day per animal was highest for buffalo (Rs.45.95) followed by crossbred cow (Rs.37.71) and local cow (Rs. 39.72). The total feed cost per day per animal was observed to be

highest in winter season followed by summer season and in rainy season. grazing of animals reduced the feed cost. The share of dry fodder was highest followed by concentrate and green fodder in case of crossbreds and local cows but share of concentrate was marginally higher for concentrate in comparison to dry fodder in case of buffalo.

The share of labour cost in gross cost ranged from 19.00% in case of local cows to 21.04% in case of crossbreds; and it was 19.35% for buffalo. The cost incurred in labour per day milch animal was highest for buffalo followed by crossbred cow and local cow. Labour cost was more in rainy season due to the more use of labour input for grazing.

Cost per litre of Milk

On the basis of per day maintenance cost and milk yield of milch animals in different seasons, the per litre cost of milk production was worked out for different seasons and presented in Table 5. Cost of milk production per litre for buffalo was highest (Rs.12.76 as compared to the milch local cow (Rs.11.27) and milch crossbred cow (Rs.9.86) in study area. The cost per litre of milk was highest in summer season followed by winter season and rainy season for all three types of animals.

Returns from Milk

To understand the business of milk production, it is crucial to know the cost of milk and net return from milk production. The milk producer's co-operative union followed two types of pricing policy for milk. In one selected village Jethana, the pricing for all types of milk whether mixed, buffalo or cow milk was made on Rs. 280 per kg. mixed milk fat in all the three seasons. But the payment in another village Bandarsendri for all these three types of milk was based on cow milk pricing i.e. Rs 240 per kg. fat plus Rs. 2.75 per litre milk as an incentive as if all these three type of milk were cow milk. Thus the average price per litre milk was different in different seasons because fat percentage in milk varies seasonally so milk producers were getting different prices for milk in different seasons.

The net return per day animal from milk was

Economics of milk production

highest for buffalo, followed by local cow and cross breeds (Table 4). Similar trend was observed in case of net return per litre of milk (Table 5). Season-wise comparison showed that the net return per day was higher in rainy season in comparison to winter and summer seasons for crossbreds and local cows but it was marginally

higher in winter in comparison to rainy season in case of buffalo. But per litre net return was higher in winter in comparison to rainy season in case of buffalo. But per litre net return was higher in case of rainy season in comparison to both winter and summer season for all types of animal. For local cows, net return per day from milk and net return per litre both were negative in summer season.

Table 1 Socio-economic profile of the sample households

| Category of Households | Herd size (range) | Sample Households (numbers) | Average Operational Land Holding (ha.) | Average Family Size (numbers) | Milch animals (number per household) | | | |
|------------------------|-------------------|-----------------------------|--|-------------------------------|--------------------------------------|-----------------|-----------------|---------------|
| | | | | | Buffalo Cow | Crossbred Cow | Local | Total |
| Small | 1-4 | 60 | 3.98 | 5.98 | 1.72 (53.41) | 0.40 (12.43) | 1.10 (34.16) | 3.22 (100) |
| Medium | 5-8 | 31 | 10.87 | 9.25 | 3.30 (53.39) | 0.80 (12.96) | 2.08 (33.65) | 6.18 (100) |
| Large | ≥9 | 13 | 18.54 | 11.71 | 5.32 (53.37) | 1.63 (16.34) | 3.02 (30.29) | 9.97 (100) |
| Overall | 4.92 | 104 | 7.85 | 7.67 | 2.64 (53.65) | 0.67 (13.61) | 1.61 (32.73) | 4.92 (100) |

Figures in parenthesis indicate percentage to total

Table 2 Investment in dairy across different categories of households (Rs. per household)

| Category of Households | Sheds and Store | Dairy Equipments | Milch Animals | Total |
|------------------------|-----------------|------------------|----------------|--------------|
| Small | 19345 (29.05) | 1279 (1.93) | 45955 (69.02) | 66579 (100) |
| Medium | 35634 (24.59) | 3540 (2.46) | 105693 (72.95) | 144867 (100) |
| Large | 55719 (26.92) | 8448 (4.08) | 142876 (69.00) | 207043 (100) |
| Overall | 28747 (26.75) | 2849 (2.65) | 75876 (70.60) | 107472 (100) |

Figures in parenthesis indicate percentage to total

Table 3 Season wise milk yield across different types of animals

| Sl.No. | Particulars | Summer | Rainy | Winter | Overall |
|--------|-----------------|--------|-------|--------|---------|
| A. | Buffalo | | | | |
| a. | Milk yield (lt) | 4.90 | 5.10 | 6.33 | 5.44 |
| b. | Fat (%) | 6.65 | 6.21 | 6.77 | 6.54 |
| B. | Crossbred | | | | |
| a. | Milk yield (lt) | 5.31 | 5.85 | 6.15 | 5.76 |
| b. | Fat (%) | 3.98 | 3.67 | 3.70 | 3.78 |
| C. | Local Cow | | | | |
| a. | Milk yield (lt) | 4.68 | 4.89 | 5.10 | 4.90 |
| b. | Fat (%) | 4.41 | 4.33 | 4.83 | 4.52 |

Economics of milk production

Table 5. Cost of milk production and return (Rs./lt)

| Sl.No. | Particulars | Buffalo | | | | Crossbred | | | | Local Cow | | | | | |
|--------|--|---------|-------|--------|---------|-----------|-------|--------|---------|-----------|-------|--------|---------|--|--|
| | | Summer | Rainy | Winter | Overall | Summer | Rainy | Winter | Overall | Summer | Rainy | Winter | Overall | | |
| A. | COST STRUCTURE | | | | | | | | | | | | | | |
| 1. | Fixed cost (a+b) | 1.86 | 1.98 | 1.49 | 1.75 | 1.18 | 1.18 | 1.04 | 1.13 | 1.04 | 1.04 | 0.87 | 0.98 | | |
| a. | Animal | 1.73 | 1.65 | 1.17 | 1.43 | 0.85 | 0.85 | 0.79 | 0.88 | 0.73 | 0.72 | 0.63 | 0.69 | | |
| b. | Building* | 0.33 | 0.33 | 0.32 | 0.32 | 0.33 | 0.33 | 0.26 | 0.25 | 0.31 | 0.32 | 0.25 | 0.29 | | |
| 2. | Variable (a+b+c) | 13.63 | 8.69 | 11.98 | 11.46 | 10.29 | 7.60 | 9.59 | 9.15 | 12.64 | 7.53 | 11.92 | 10.70 | | |
| a. | Feed** | 10.50 | 4.70 | 9.86 | 8.45 | 7.90 | 4.61 | 7.19 | 6.55 | 10.20 | 4.14 | 9.95 | 8.11 | | |
| i. | Green | 3.10 | 0.13 | 2.06 | 1.77 | 1.60 | 0.52 | 1.38 | 1.16 | 2.34 | 0.20 | 2.10 | 1.54 | | |
| ii. | Dry | 4.10 | 0.97 | 4.31 | 3.21 | 3.43 | 1.63 | 3.31 | 2.79 | 5.06 | 0.84 | 5.17 | 3.72 | | |
| iii. | Concentrate | 3.30 | 3.60 | 3.49 | 3.47 | 2.87 | 2.46 | 2.49 | 2.60 | 2.80 | 3.10 | 2.68 | 2.85 | | |
| b. | Labour | 2.55 | 3.72 | 1.62 | 2.56 | 1.85 | 2.68 | 1.94 | 2.17 | 2.08 | 3.02 | 1.59 | 2.22 | | |
| c. | Misc*** | 0.58 | 0.27 | 0.50 | 0.45 | 0.54 | 0.32 | 0.46 | 0.44 | 0.37 | 0.37 | 0.38 | 0.37 | | |
| 3. | Gross Cost (1+2) | 15.48 | 10.67 | 13.47 | 13.21 | 11.48 | 8.79 | 10.63 | 10.29 | 13.68 | 8.56 | 12.80 | 11.68 | | |
| 4. | Value of dung | 0.50 | 0.48 | 0.38 | 0.45 | 0.46 | 0.42 | 0.40 | 0.40 | 0.43 | 0.41 | 0.39 | 0.41 | | |
| 5. | Net Cost (3-4) | 14.99 | 10.20 | 13.09 | 12.76 | 11.02 | 8.37 | 10.24 | 9.86 | 13.25 | 8.16 | 12.41 | 11.27 | | |
| B. | RETURN STRUCTURE | | | | | | | | | | | | | | |
| 6. | Average price (Rs./lt) | 18.55 | 17.58 | 19.15 | 18.43 | 11.14 | 10.27 | 10.36 | 10.59 | 12.86 | 12.54 | 13.82 | 13.07 | | |
| 9. | Returns from milk for milch animals (Rs./lt) | 3.56 | 7.38 | 6.06 | 5.67 | 0.12 | 1.90 | 0.12 | 0.73 | -0.39 | 4.38 | 1.41 | 1.80 | | |

*Building, equipments and machine

**Feed & fodder

***Miscellaneous

CONCLUSIONS

An exploratory study of economics of milk production in different animal's vis-a-vis different seasons was conducted in Ajmer district. In the study area, farmers' third main occupation was dairy farming. The study revealed that in average herd of farmers buffalo population was highest followed by local cow and cross bred cow. The share of milch animal was highest in total investment in dairying across all categories of households. The study indicated that in the study area, stall feeding and grazing were the most prevalent mode of feeding dairy animals in different seasons. The seasonal variation in cost of milk production in the rainfed area is very important since feed and fodder availability and accessibility drastically changes over the different seasons. In

the study area, productivity difference between the milch animals was not found to be very high. But fat content in the milk varies between the different types of milch animals. In the study area, milk pricing was mainly based on fat content of milk which caused huge difference in returns from different type of milch animals. The cost of milk production was found to be higher for buffalo milk but it also generated highest returns to the farmers. Local cow rearing yield lowest return in the study area and it is reflected through lower number of local cow with respect to buffalo in the average herd composition. The low net returns from local cow and crossbred cow milk production that milk production is unsustainable in this region as a large proportion of milk production expenses accounted in the study, do not enter the accounts of farmers.

REFERENCES

1. Das, S. 2004. Economic efficiency of milk production and marketed surplus in rural area of Burdwan district (West Bengal), M.Sc. Thesis, NDRI (Deemed University), Karnal, Haryana.
2. Desai, Vinod, 2005. An economic analysis of milk production and disposal pattern of milk in rural area of Bidar district (Karnataka), M.Sc., Thesis, NDRI (Deemed University), Karnal, Haryana.
3. Durai, P.R. 2002. Economics of milk production in Madurai district of Tamil Nadu, M.Sc., Thesis, NDRI (Deemed University), Karnal, Haryana.
4. Kumar, A.P. 2003. Economics of milk production and marketed surplus of milk in Vellore district of Tamil Nadu, M.Sc. Thesis, NDRI (Deemed University), Karnal, Haryana.
5. Kumar, B.G and Pandian, A.S.S. 2003. Input output relationship in milk production in Tamil Nadu. Indian Journal of Dairy and Bio-sciences, 12:55-57.
6. Singh, A.R. 2001. Economic analysis of technological change in milk production in Karnal District of Haryana, M.Sc. Thesis. NDRI (Deemed University). Karnal, Haryana, India.
7. Singh, R.N. 2005. Economic analysis of milk production in tribal area of Udaipur (Rajasthan), M.Sc.) Thesis, NDRI (Deemed University), Karnal, Haryana.
8. Singh, Kh. R. 2006. Economics of milk production and marketed surplus in Imphal district of Manipur, M.Sc. Thesis, NDRI (Deemed University), Karnal, Haryana.

★ ★ ★