

# ECONOMICS OF MILK PRODUCTION OF MEMBER FARMERS OF DAIRY COOPERATIVES: A STUDY IN BARPETA (ASSAM)

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## Abstract

Dairy sector in India owns great potentialities particularly after the launching of 'Operation Flood programs' promoting the concept of cooperative approach of milk production. The study has been conducted in Barpeta district, a home with a number of 63 dairy cooperative societies and a booming center of milk production in Assam. Present study is an attempt to analyze the economics of milk production among different categories of member farmers of dairy cooperative societies in Bajali area of Barpeta district. It is found that return from dairy farming is profitable under dairy cooperative societies as the members of the dairy cooperatives not only keep superior breed of cattle but also follow better feeding and management practices. The positive impact of cooperatives is the result of the various efforts taken by the dairy cooperatives in providing several additional services such as subsidized feed, credit accessibility, training regarding improved dairy farming practices and so on.

**Key Words: Dairy farmers, dairy cooperative society, cost and return, Barpeta, Assam**

## I Introduction

India is basically an agrarian country and agriculture still holds the key of primary occupation for the upliftment of the rural people. Dairying in India has been recognized as an instrument in the enhancement of rural development. India is the largest milk producing nation in the world, achieving an annual output of 176.4 million tons during 2017-18 as compared to 165.4 million tons during 2016-17. The per capita availability of milk has increased from 176 gms per day in 1990-91 to 374 gms per day during 2017-18. This success story has been driven by millions of small holder producers. With this progress, dairying has assumed an important secondary source of income and employment opportunity for the rural households of India. As a result, the income of dairy farmers is augmented by 23.77 percent in 2014-17 compared to the period 2011-14 (Ministry of Agriculture & Farmers Welfare, GOI). Dairy sector in India owns great potentialities particularly after the launching of 'Operation Flood programs' promoting the concept of cooperative approach of milk production. Dairy cooperatives play an important role to improve the small milk producers' economy in different regions of India (Meena and Jain, 2012). The dairy cooperative system have not only provided network of milk collection, processing, and distribution to the rural households but also provided the technical inputs like provision of feed inputs, health services, and artificial insemination etc. Farmers will make our country self-sufficient in terms of food requirements only if they are adequately supported by public policies with respect to pricing and marketing. Cost of milk production is an important aspect for producers, consumers and policy makers in portraying the economic viability and effective linkage between producer and consumer, so that the producers get the remunerative price of milk and consumer get milk at reasonable rate. The bulk of milk production in our country is in the hands of millions of small holder producers who are illiterate and ignorant of the economic aspects of dairy enterprise. Most of the dairy farmers are not aware of the cost and return structure and the economic viability of dairy farming. With increase in the cost of inputs and raw materials, the study of cost and return is important to encourage the poor farmers to take up dairying as a means of their livelihood. The estimation of cost and return structure is indispensable for any future policy formulation in dairying and improving the productivity levels of the producers. In this context, an attempt has been made to analyze the economics of milk production among different categories of households of dairy cooperatives.

## DCS in Assam

In Assam, about 70 percent of work force are engaged in agriculture and allied activities. Assam possess 10307.70 cattle and 435.27 buffalos with a total of 19.08 million livestock population (19<sup>th</sup> Livestock Census). Dairy farming has tremendous scope in Assam, with increased milk production there is an urge to arrange proper storage and

marketing at remunerative price (Bhattacharyya, 1998). With the implementation of various schemes for the development of dairy farming in Assam, less privileged farmers accept dairy farming as a means of enriching their socio-economic conditions. Still dairy sector in the eastern part of the country is far lagged behind in the achievement of projected growth. A jump in the milk production is possible by increasing the productivity of milk and linking rural farmers to dairy cooperatives/self-helped groups with linkages to milk processing. The organized dairy farming in Assam started after the 'Dairy Development Scheme' sanctioned in March 1960. As per data, there are 374 numbers of dairy cooperative societies with 20 thousand milk producers, whereas only about 51 thousand litres of liquid milk are marketed by these dairy cooperative societies (NDDDB, 2017-18). West Assam Milk Union Limited (WAMUL) is the progressive milk union of Assam to stimulate the all-round development of the milk producers by managing to procure 29,590 kg of milk per day from dairy farmers through registered dairy cooperative societies and its own collection centres during the year 2017-18. The study has been done in Barpeta district of Assam which has been selected out of 9 potential districts by NDDDB, having highest potentiality of milk production (Kakaty and Das, 2017). In 2002, after the implementation of Government of Assam 'SwarnaDhenu Scheme' in Bajali subdivision of the district, milk production has increased subsequently. In March 2002, first dairy cooperative society was formed under the supervision of animal husbandry with the name of Bajali Dairy Cooperative Society. So far 63 dairy cooperative societies are formed under the World Bank aided project AACP. The objective of these societies are to collect milk from the dairy farmers by paying a remunerative price through effective marketing facilities. Today the greater Bajali area is the home to the booming center of milk production in Assam. Present study is an attempt to analyze the cost and return structure of dairy farmers under cooperative society in Barpeta district of Assam. The findings would be helpful in formulating the policy regarding their economic viability under cooperative system.

## II Data and Methodology

Bajali sub-division in Barpeta district is purposively selected having a huge number of dairy cooperative society. A sample of 60 milk producers has been drawn randomly from 6 dairy cooperative societies namely Kamdhenu DUSS, Kaberi DUSS, Himalay DUSS, Bezkuhi DUSS, Baghmara DUSS, Dhenushri DUSS. The dairy farm households have been identified as the farmers who have at least one in-milk cattle during the survey. The list of farmers is prepared through discussion with key informants including the Secretary of Dairy Cooperative Societies, Veterinary Surgeon associated with the villages of farm households. These 60 households are then post stratified into three herd size categories namely small (below 3 milch animals), medium (3-5 milch animals) and large (above 5 milch animals) on the basis of total milch animal units in each household. Primary data are collected on various aspects of milk production using a well-structured pre tested schedule for the year 2018-2019.

The cost of milk production is classified into variable cost and fixed cost.

**Fixed cost:** Fixed costs refer to those costs which remain unchanged over the short period of time. In this study it includes depreciation on fixed assets like animals, cattle sheds and dairy equipment and interest on fixed capital. Depreciation on fixed capital is worked out separately for milch animals, cattle sheds and equipment. Depreciation on milch animals is calculated by using straight line method.

$$\text{Annual Depreciation} = \frac{\text{Original Value} - \text{Junk Value}}{\text{Productive life}}$$

For the calculation of depreciation on cows, the cows are graded according to the stages of lactation. The cows which are in I, II, III and IV lactations are not subjected to depreciation (Baruah, 1995). Depreciation rate on milch animals is worked as follows:

Crossbred cows - 8 per cent (productive life 12.5 years),

Local cows -10 per cent (productive life 10 years).

The sheds are classified into Pucca-shed and Kutcha-shed. The depreciation on Pucca-sheds and Kutcha-sheds are 2 per cent and 5 per cent assuming the useful life of building as 50 and 20 years respectively and depreciation is considered at 10 per cent per annum for dairy equipment as per the method followed by Rao, 1991.

**Interest on Fixed Capital-** The interest on fixed capital comprising the value of cattle shed, milch animal and equipment is estimated at the prevailing rate of interest i.e. at 10.5 per cent per annum.

As dairy farms maintain animals of different species and age groups, it is important to determine the relative share of fixed costs attributable to milch stock. The livestock are converted into **Standard Animal Units** (Patel et al., 1983).

The following relative weights are assigned-

Local cow	= 1.00
Crossbred cow	= 1.40
Buffalo	= 1.30
Crossbred heifer (> 1 yr.)	= 0.75
Crossbred heifer (> 2 yr.)	= 1.00
Buffalo/Local calves (>1 yr.)	= 0.50
Buffalo/Local heifer (> 2 yr.)	= 0.75
Other calves (< 1 yr.)	= 0.33

**Variable cost:** variable costs are those costs which are incurred during production and can be altered in the short run. These costs include feed, labour, veterinary and miscellaneous costs.

**Feed Cost-** The feed cost consists of the cost of green fodder, dry fodder and concentrates.

**Labour Cost:** It includes family as well as hired labour. The hired labour is calculated considering time utilized in various dairy activities and wages paid. 8 hours of work by an adult male is considered as one man-day. 1 day of women labour = 0.67 man-day (3 women=2 men). In case of family labour, the imputed value is taken as per the prevailing wage rate of casual labour in the study area. The prevailing wage rate is taken as Rs. 300 in the study area.

**Veterinary Cost:** It includes the cost incurred on natural services, artificial insemination (A.I.), vaccination, medicines and other charges/fees of veterinary doctors.

**Miscellaneous Cost:** The miscellaneous expenditure covers the purchase of ropes, transportation cost, repairs carried out to cattle shed and equipment used and electricity.

For all joint costs, the apportionment is based on SAU.

**Gross Cost:** It is reckoned by adding all the cost components involved in the fixed and variable costs, i.e. **Gross Cost = Total Fixed Cost + Total Variable Cost**

**Net Cost:** The net cost is obtained by deducting the imputed value of dung, value of young stock, value of gunny bags and value of by products from the gross cost. Other than milk, these are also reflected as a source of income.

**Gross returns:** Gross returns are attained by adding the value of milk produced, value of dung, value of young stock, value of gunny bag and value of by product.

$$Gross\ Returns = Y_m P_m + Y_d P_d + Y_y P_y + Y_g P_g + Y_b P_b$$

**Net returns:** Net returns are designed by subtracting total cost from gross returns.

**Milk Yield and Price of Milk:** The price of milk differs according to the season. Based on climatic condition and milk production, the year is divided as flush (December to March) and lean (April to November). The average daily milk yield is estimated by taking into account the quantity of milk produced during the length of flush and lean season.

### III Results and discussion

#### Cost and return analysis

Table 1 presents the economics of dairying with imputations of cost and return of different categories of sample households of dairy cooperative societies. Cost components are categorized into- recurring expenditure or variable cost and fixed cost or overhead cost per day. The overall total cost incurred per milch animal per day for the entire sample is found to be Rs. 282.29, of this, 92.93 percent accounted for total variable cost and total fixed cost is 7.07 percent for overall category. Total cost for small, medium and large households is estimated as Rs. 292.05, Rs. 268.17 and Rs. 288.12. The higher cost involved in small herd size group is due to higher cost incurred in feed cost and veterinary charges. The overall total variable cost per animal per day is found to be Rs. 262.32. Feed cost is the major component in variable cost where green fodder, dry fodder and concentrates taken together constitute about 57.14 percent of the total cost of maintenance of a cow. This finding is similar to the Singh and Gupta (2010) where they observed feed cost to be the major constituent in variable cost. Concentrate constitute the major feed cost contributing 35 percent of gross cost across all the categories. The overall labour cost, veterinary charges and miscellaneous expenses are Rs. 92.91 (32.91 percent), 3.27 (1.16 percent) and 4.82 (1.79 percent) respectively. The overall total fixed cost is estimated as Rs. 19.97 irrespective of unit size. Fixed cost per day per farm is calculated as Rs. 20.43 in small category, Rs. 19.49 in medium category and Rs. 20 in large category of dairy farms. This includes depreciation (on cattle shed+ on milch animal+on dairy equipment) Rs. 1.86 and interest on fixed asset Rs. 18.11 accounted for the majority of the share of total fixed cost.

So far as recurring expenditure is concerned, it is observed that the highest and lowest variable costs are calculated as Rs. 271.62 and Rs. 248.68 for small and medium size category contributing 93 percent and 92.73 percent to the total cost respectively. The magnitude of feed cost is the highest for small herd size category (Rs. 162.94) and lowest for large herd size category (160.29) across various categories. Labour cost is found to be highest for large herd size category i.e. Rs. 101.5 (35.41 percent).

**Table 1: Cost incurred by dairy farms (Rupees per cow per day)**

Sl. No.	Particulars	Herd size category			Overall
		Small	Medium	Large	
1	Green Fodder	14.75 (5.05)	14.25 (5.31)	17.01 (5.41)	14.84 (5.26)
2	Dry Fodder	45.56 (15.60)	51.83 (19.33)	45.61 (15.91)	47.67 (16.89)
3	Concentrate	102.63 (35.14)	96.11 (35.84)	97.67 (34.07)	98.80 (35)
4	Total Feed Cost	162.94 (55.79)	162.19 (60.48)	160.29 (55.63)	161.31 (57.14)
5	Labour cost	98.9 (33.86)	78.34 (29.21)	101.5 (35.41)	92.91 (32.91)
6	Veterinary	4.04 (1.38)	3.13 (1.17)	2.63 (0.92)	3.27 (1.16)
7	Miscellaneous	5.74 (1.97)	5.02 (1.87)	3.7 (1.29)	4.82 (1.71)
8	Total Variable Cost	271.62 (93.00)	248.68 (92.73)	268.12 (93.02)	262.32 (92.93)
9	Depreciation	1.42 (0.49)	2.23 (0.83)	1.93 (0.67)	1.86 (0.66)
10	Interest on fixed Asset	19.01 (6.51)	17.26 (6.44)	18.07 (6.30)	18.11 (6.42)
11	Total Fixed Cost	20.43 (7)	19.49 (7.27)	20 (6.98)	19.97 (7.07)
12	Gross Cost	292.05	268.17	288.12	282.29

(Figure in parenthesis indicates percentage of total cost)

Table 2 shows the return per cow per day across different categories of farms. The total income taking the entire sample together is pooled as Rs. 381.18 per cow per day across all categories. A close perusal of the table reveals that gross returns per cow is the highest in large herd size category (Rs. 425.67), in small category the gross return per cow is Rs. 373.45 and it is Rs. 344.41 for medium herd size category. The reason for higher returns in large herd size is because of the improved breed of cattle which is attributable to higher milk yield. According to the herd size categories, net return is the highest for large herd size category with Rs. 139.03 followed by small and medium herd size category with Rs. 81.4 and Rs. 76.24 respectively. The profits from selling milk constitutes the larger proportion of income of the producers. The returns from sale of cow dung, calves and processing contributed to the total income in a nominal way. The average milk yield on small, medium and large farms is found to be 8.15, 7.47 and 7.84 litres per day resulting overall milk yield as 7.82 liters. Reason attributed to the higher return may be due to rearing improved breed cattle, higher milk production, better management practices, selling milk at remunerative price under dairy cooperatives, input received from dairy cooperatives at subsidized rate and providing bonus per litre of milk by dairy cooperatives. Meena and Jain (2012), Ravishankara (2014) also reported higher return in the beneficiary areas/member households of dairy cooperative societies in the study area.

**Table 2: Return from milk production (Rupees per cow per day)**

Sl No.	Return components	Herd size category			Total
		Small	Medium	Large	
1	Milk yield	8.15	7.47	7.84	7.82
2	Price/litre of milk	39.19	40.36	39.4	39.65
3	Value of Milk	321.34	303.02	309.25	311.20
4	Value of Dung	2.4	5.41	8.39	5.4
5	Value of Young Stock	45.48	30.75	75.89	50.71
6	Value of Gunny Bag	2.26	4.68	11.56	6.17
7	Value of Farm Product	1.97	0.55	20.58	7.7
8	Gross Return	373.45	344.41	425.67	381.18

Per litre cost of milk production is estimated as Rs. 27.23 which decreases with the increase in herd size. The cost per liter milk is the highest i.e. Rs. 30.36 in medium herd size group, while it is Rs. 21.71 and Rs. 29.44 for large and small herd size categories respectively. Average price per litre of milk is estimated as Rs. 39.65 for overall category of farms of dairy cooperative societies.

**Table 3: Cost and Return analysis (Rupees per cow per day)**

Sl no.	Cost and return components	Herd size category			Total
		Small	Medium	Large	
1	Net cost	239.94	226.78	170.22	212.31
2	Net return	81.40	76.24	139.03	98.89
3	Cost/litre of milk	29.44	30.36	21.71	27.17
4	Return/litre of milk	9.99	10.20	17.73	12.64

**IV Conclusion**

The cost and return measures obtained in the present study suggest that milk production is profitable under dairy cooperative societies in the study area. Study indicates positive impact of dairy cooperative societies on parameters like average cost and return as evidenced from the result of the investigation. The positive impact of cooperatives is the result of the various efforts taken by the cooperatives in providing several additional services such as subsidized feed, credit accessibility, training regarding improved dairy farming practices and so on. Other probable reasons of this positive impact on return is the benefit of bonus received by the farmers for their milk produce from time to time under dairy cooperatives. The return from selling of milk constitutes the maximum proportion of income in the entire categories of the farm. To make dairying viable, efforts should be made for up gradation of less productive local cows to highly productive breeds. Increase in the return would be possible by taking initiatives to frame proper plan for providing cattle feed at a subsidized rate under dairy cooperative network. The findings of the study will be significant in formulating proper policies for the benefit of members of dairy cooperative societies as well promote cooperative movement in the field of dairying in the state.

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