

Cost of Milk production and Gross Returns to Milk Producers in the Selected States of India *(Coordinated- Consolidated Report)*



*Report submitted to the
AER Division, Directorate of Economics and Statistics,
Department of Agriculture and Farmers Welfare,
Ministry of Agriculture and Farmers Welfare, Government of India*



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(Ministry of Agriculture & Farmers Welfare, GOI)
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Shrikant Kalamkar, Kinjal Ahir & Hemant Sharma

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Disclaimer:

- The findings of the study cannot be generalized. There are some limitations related to the data received from the participating centers. The data regarding the cost of milk production were collected (2020-21) through the personal interview using a pre-tested schedule for a day before the visit (one-point time), while data for earlier seasons was taken on a recall basis. Cost of milk production was estimated at one point of time and for particular selected study village area. Cost of grazing was accounted while the difference in quality of fodder/grass consumed was not reported. All the findings in the report are with reference to only those tahsils/villages of the country that were enumerated in data collection. Any generalization or extrapolation for the whole state or the whole country based on the findings of this study may not reveal true picture of the entire geographical territory of the state or the country. Thus, comparison with secondary evidences may be inappropriate and misleading. The dairying in India is heavily based on seasons in view of availability of fodder and suitability of breed. Also feeding of milch animals was estimated on the basis of respondents' responses (based on recall) which may have considered only total fodder served to animals irrespective of wastages. Thus, total fodder consumption may not technically match with consumption ration as per body mass of animal. This survey was carried out during winter months (November and December 2022) and hence comparison of the findings of this study with the surveys conducted in different seasons may not be comparable.

Foreword

Importance of livestock in general and dairying in particular hardly needs emphasis in a country like India. It is one of the important sub-sectors of agriculture, next only to field crops. The dairy subsector occupies an important place in the agricultural economy of India as the contribution of milk to Gross National Product (GNP) is the largest among agricultural commodities. Among the sub-sectors of livestock sector, dairy and meat group (poultry meat) are high-growth sectors and is reflected in the growing importance of the contribution of these sub-sectors in the livestock economy. While, two third of total value of output from the livestock sector during 2023-24 was accounted for, by the milk group, almost one fourth share was of the meat group. The use of dung as fuel also significantly contributed in total value of output of livestock sector by around 5 per cent.

Dairying has become an important secondary source of income for millions of poor and rural households and has assumed an important role in providing employment and income generating opportunities particularly for marginal and women farmers as well as for landless laborers. This sector has created a significant impact on providing equity in terms of employment and has supported efforts in poverty alleviation as well. It cannot be merely a co-incidence that the level of rural poverty is significantly higher in states where livestock sector is underdeveloped. This is the sector where the poor contribute to growth directly instead of only deriving benefits from growth, unlike other sectors of the economy. Besides, milk has always played a critical role in addressing hunger and malnutrition.

Cost plays an important role in portraying economic viability of a dairy enterprise. It is a critical economic indicator for milk producers, consumers and policy makers in order to provide an effective linkage between the milk producers and consumers for fixing the price of milk rationally. Generally, a milk producer can increase his/her dairy income in two ways; either by increasing the milk production or by reducing cost of milk production. Cost of milk production often becomes a policy issue, when milk producers complain that the price of milk, they are getting does not cover the cost of milk production. One of the main problems identified is that many dairy producers, especially small operators, are unaware of their costs of production and financial breakeven point. During these tough times, it is important for producers to see how they can reduce costs without reducing milk production. Therefore, there is a need to know the cost of milk production and the break-even point to estimate the minimum quantity of milk to be produced to cover the total cost on all the cattle size groups for the cows and buffaloes. Breakeven point is a point where no profit no loss status is achieved. The costs that are to be covered by the milk price determine the break-even point, or price.

Keeping the above background in mind, it was felt necessary to study the per liter cost of milk production as well as study the break-even analysis for dairy farmers (small, medium, and large) for milch cows and buffaloes. In view of the above, on the request of Dairy Division, Department of Animal Husbandry and

Dairying, Ministry of Fisheries, Animal Husbandry and Dairying, Government of India, the AER Division of Directorate of Economics and Statistics, Department of Agriculture and Farmers Welfare, Ministry of Agriculture and Farmers Welfare, Government of India entrusted Sardar Patel University, Vallabh Vidyanagar Centre an 'All India Coordinated study' to know the cost of milk production and returns in selected states of India. The study covered 12 major states of India and came out with important and relevant policy implications which would help to adopt strategic interventions to enhance net income of the milk producers.

I am thankful to authors and the research team for putting in a lot of efforts to complete this excellent piece of work. I hope this report will be useful for policy makers and researchers.

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We have benefited immensely from various scholars and officials from different government departments while carrying out this study. At the outset, we would like to thank **Prof. Niranjan Patel**, Vice Chancellor of our University and Chairman, AERC Advisory Body for his constant encouragement and support for undertaking such research activity at the Centre. We also thank **Dr. Bhailalbhai Patel** (Registrar) and **Dr. Bhautik Patel** (Former CAO I/c), **Shri Yagnesh Dalwadi** (present CAO I/c), Shri Kaushal Mistry (Deputy Accountant) for their necessary administrative support.

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The study would not have reached its conclusion without the active co-operation of the respondent dairy households from selected villages who provided all the required data for the study without any hesitation and expectation. We thank each one of them for their invaluable support.

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List of Abbreviations

AERC	- Agro-Economic Research Centre
A.I.	- Artificial Insemination
ACZ	- Agro Climatic Zone
ADP	- Annual Development Plan
AERU	- Agro-Economic Research Unit
AN	- Animal Nutrition
AP	- Andhra Pradesh
ASMM	- Area Specific Mineral Mixture
Av.	- Average
B	- Buffalow
BEP	- Break Even Point
CB	- Cross Breed
DAHD	- Department of Animal Husbandry
DCS	- Dairy Cooperative Society households
DM	- Dry Matter
EIA	- End Implementing Agency
FGD	- Focus Group Discussion
GNP	- Gross National Product
GOI	- Government of India
GVA	- Goss Value Added
ha	- Hectare
HH/hh	- Household
L	- Large
LC	- Local Cow
LTPD	- Litres per day
M	- Medium
M.T./mt	- Metric Tone
MAAHI	- Maahi Milk Producer Company Limited, Rajkot
MCLR	- Marginal Cost of Funds Based Lending Rate
MGNREGA	- Mahatma Gandhi National Rural Employment Guarantee Act
mha	- Million hectares

MMT	- Metric Million Tonnes
MP	- Madhya Pradesh
MH	- Maharashtra
MU	- Milk Union (district level)
NA	- Not Available/ Not Applicable
NDCS	- Non-Dairy Cooperative Society households
NDDB	- National Dairy Development Board
NDP	- National Dairy Plan
NITI Ayog	- National Institution for Transforming India
No./Nos	- Number
ONFE	- Own Non-Farm Establishment
PDCS	- Primary Dairy Cooperative Society (village level)
PIB	- Press Information Bureau
PMC	- Project Management Cell
PMU	- Project Management Unit
Prodvty.	- Productivity
PB	- Punjab
RJ	- Rajasthan
Rs.	- Rupees
S	- Small
SAUs	- State Agricultural University
SC	- Scheduled Caste
SF/MF/AL	- Small Farmer, Marginal Farmer, Agricultural Laborer
ST	- Scheduled Tribe
TC	- Total Cost
TN	- Tamil Nadu
TR	- Total Revenue
TVO	- TVO- Total Value of Output
UP	- Uttar Pradesh
WB	- West Bengal
Y	- Yield

Executive Summary

Cost of Milk Production and Gross Returns to Milk Producers in the Selected States of India (Coordinated- Consolidated Report)

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Introduction

India ranks first in the World in milk production (accounts for around 24 per cent of world milk production), which increased from 17 million tonnes in 1950-51 to 239.3 million tonnes in 2023-24 and presumably no longer suffers from shortages. It has eclipsed other major producers such as the United States, China, Pakistan, and Brazil. Nearly 51 percent of milk production is contributed by cow followed by buffalo (45.32%) and goats (3.36%). Most of the milk is produced by animals reared by small, marginal farmers and landless labourers. However, unlike the larger herd sizes of leading milk producing countries in the World, some 95 per cent of milk producers in India hold just 1 to 5 milch animals (the animals that are farmed for the production of milk) per household, which makes this little more than a subsistence-level farming system. While around 80 million households in India are engaged in dairy farming, about 17.2 million farmers have been brought under the ambit of 235877 village level dairy cooperative societies up to March 2024.

The livestock sector is considered to be an integral part of Indian agriculture. Among various agricultural enterprises, common households maintain livestock as a complementary activity to supplement the income and nutritional requirement of the family. Considering the vagaries of the monsoon and its adverse effect on crop production, dairy farming is emerging as a major source of income as well as for employment in rural areas and it has broader social and economic dimensions. Generally, a milk producer can increase his dairy income in two ways, either by increasing milk production or by reducing the cost of milk production. While cost play an important role in portraying the economic viability of a dairy enterprise. It is a critical economic indicator for milk producers, consumers, and policymakers in order to provide an effective linkage between the milk producers and consumers for fixing the price of milk rationally. The cost of milk production often becomes a policy issue, when milk producers complain that the price of milk that they are getting, does not cover the cost of milk production. One of the main problems identified is the lack of awareness among dairy producers, especially small operators, regarding their costs of production and financial breakeven point. It is important for producers to identify how they can reduce costs without reducing milk production. The Break-even point is often used to estimate the minimum quantity of milk to be produced to cover the total cost of milk production. A comparison across all sizes of household groups for both the cow and buffaloes can be resourceful in various decision-making. With these considerations, the knowledge about the cost of milk production is an important tool for the evaluation of the economics of dairy enterprise. It would help producers to ensure that producers get remunerative prices for milk and consumers to get milk and milk products at a reasonable price. The objective of the present study is to analyse the cost and returns to milk production across different herd sizes of bovine in selected states of India.

Data and Methodology

The study is based on data collected from both secondary and primary sources. For the study, primary data was collected from the selected milk producers through structured and pre-tested schedules. The study was conducted in 12 major states [11 top states having the highest milk production and highest total bovine (cow & buffaloes) population] and Assam state among North-Eastern States of India. The selected states (viz. Bihar, Maharashtra, Madhya Pradesh, Andhra Pradesh, Tamil Nadu, West Bengal, Karnataka, Gujarat, Rajasthan, Punjab, Haryana and Assam) account for 72.7 percent of total milk production and 66.71 percent of the total female bovine population in the country (2019). The multistage stratified random sampling method was used to select the sample dairy households. The milk producers were categorized as follows as per their ownership of the number of bovine population- Small Milk Producers (1-2 milch animals), Medium Milk Producers (3-4 milch animals) & Large Milk Producers (5 Milch animal and above). Only in milch cattle and buffaloes were considered. From each village, 20 dairy households/milk producers were selected randomly and it was assured that the number of respondents were proportionate to the number of households in each category of ownership defined previously. Thus, total sample in each taluka was 40 from two villages and total 80 in Agro-Climatic Zone (ACZ) Group. Total sample size of milk producers for each State was 240. The survey schedule for the collection of primary data collection was developed. Simple analytical tools like tabular analyses and graphical plots are used to present the data effectively in the report.

Major Findings:

- *On an average, across all group, majority of the respondents (>89%) of selected states were male, except in Tamil Nadu state where more than one-fourth of respondents were female (28%). Except Bihar and Assam where share of female respondents was highest in large group, in other states, higher female share was reported with small group.*
- *The share of female workers in total family members engaged in dairy activities indicate that women participation was higher than male in the state of Karnataka (76.9 percent), Gujarat (56.4 percent), Rajasthan (54.2 percent), and Madhya Pradesh (50 percent). If we consider the share of family female workers to total adult workers (male + female in the family), it was observed that at overall level, the highest share was estimated in Karnataka (76.9 percent) followed by Gujarat (56.6 percent), Rajasthan (56.4 percent), Madhya Pradesh (50 percent) & Maharashtra (49.1 percent).*
- *The main occupation of the selected households was agriculture (comprised of cultivation of land as a farmer along with supportive allied activities of animal husbandry and dairying). The lowest share of households engaged in agriculture was reported in Assam. It may be attributed to high share of households engaged in services.*
- *It was observed that in general, more than 70 per cent of households possessed agricultural land while significant landless households were observed in Gujarat (29.2 per cent), Tamil Nadu (22.5 per cent) and West Bengal (20.8 per cent). This trend suggests that the households with no land are also engaged in rearing the milch animals as a source of income. In Tamil Nadu, almost half of households selected under study were from small animal size category and were engaged primarily in dairy business without agricultural land support. While half of the selected households in Gujarat and Madhya Pradesh from large animal holder group were landless and engaged primarily in dairy business.*

- *The highest herd strength was estimated in Gujarat (6.97) followed by Madhya Pradesh (6.36), and Maharashtra (6.07) and the lowest was reported in Bihar having 4.14 animal. The number of milch animals (during visit), on which milk production depends, were found to be highest in absolute number on an average in Andhra Pradesh (3.60) followed by Gujarat (3.56 animals) and Maharashtra (3.43 animals).*
- *The respondents from the states like Gujarat, Maharashtra, Punjab, Tamil Nadu had the necessary productive assets such as milk cans, grass cutter and fodder choppers. Dairy owners in the states of Bihar, Rajasthan and Madhya Pradesh lack the basic assets with them in required quantity. Except Bihar, West Bengal, Andhra Pradesh and Tamil Nadu, all the states sample households had tractor trolley asset with them.*
- *The share of dairy business in total income of the household ranged between 38 to 41 per cent in the state of West Bengal, Andhra Pradesh, Assam, Gujarat, Karnataka and Tamil Nadu. The share of the same in the states of Bihar, Maharashtra, and Madhya Pradesh was estimated between 17 to 27 per cent. It was very surprising to note that in Madhya Pradesh, share of animal husbandry in total income of selected households was hardly 17 per cent. It could be attributed to higher share of income from other sources.*
- *The correlation analysis of the income received from all sources and income received from dairy business indicates very high positive correlation and association between two variables in dairy households. It was estimated that in Tamil Nadu, Gujarat, West Bengal and Punjab positive correlation existed, which means income received from dairy and income from all sources simultaneously moved in same direction. While correlation was normal in the states of Maharashtra, Rajasthan, Haryana, Bihar and Assam. Very poor correlation between annual income and income from dairy was observed in the states Madhya Pradesh and Andhra Pradesh.*
- *The average highest milk yield of local cows was reported in Punjab (7 litres/day) and the lowest was in Madhya Pradesh (1.27 lit/day). The non-descript breed in Madhya Pradesh may be responsible for low level of milk productivity of cows in the state. The crossbred as well as buffalo milk yield was also reported highest in Punjab (16.7 lit/day and 10.33 lit/day) and the lowest in Madhya Pradesh (4.41 lit/day and 4.71 lit/day). In case of milk rate per litre, the highest rate per litre was realised by the selected households in Assam in all the three types of animal milk. The lowest milk rate for local cows was realised by Haryana, for cross breed cows was realised by selected households in West Bengal and for buffaloes, lowest rate for milk was realised in Karnataka.*
- *The average age of milch animals with selected households was between 5 to 7 years having completed 2 to 3 lactation period.*
- *The average age of calving was around 28 to 38 months. During the milk cycle, around 267 to 282 days of lactation period was recorded while dry period ranged between 75 to 87 days across the breeds. Across the breed, dry period was the highest for local cows, followed by cross bred cows and the lowest was for buffaloes.*
- *The total fodder feeding was found highest for crossbreed cows followed by that for buffaloes and the lowest for local cows, across various states. Feeding was found to be highest in Karnataka, specially during in-milk period. The season-wise per animal feeding of fodder indicates that more quantity of green fodder was fed during the flush season while during lean season, dry fodder was used. In the states of Gujarat, Rajasthan, Punjab, and Haryana, greater use of concentrates for milch animals was*

found, which may be attributed to the availability and support of dairy societies in providing concentrates at the village level.

- *Besides feeding the animals at stall, few selected households had sent their animals for grazing out every day for few hours. Grazing hours were reported higher in the states of Gujarat and Assam, followed by MP & Karnataka, while cost of grazing was the highest in Gujarat.*
- *The use of female labour was higher in Gujarat, Rajasthan, Maharashtra, and Haryana while same was almost equal to that of use of male labour in the states of Andhra Pradesh, Karnataka, Tamil Nadu, and West Bengal and greater share of male labour was observed in the states of Bihar, Punjab, and Assam.*
- *The cow milk was preferred for home consumption by the selected households from among the milk available at home across all three breeds (local cows, cross breed cows and buffalo). The highest share of total milk consumed at home was reported in Rajasthan (54.37 per cent) followed by Haryana (50.21 per cent), Gujarat (46.55 per cent), Madhya Pradesh (41.41 per cent), an Assam (36.59 per cent). The next source of milk preferred by selected households for home consumption was buffalo milk, which accounted for as high as 38.09 per cent of total milk produced by selected households of Haryana (38.09) followed by Madhya Pradesh (34.28 per cent) and Punjab (20.4 per cent).*
- *The sale of crossbreed milk to cooperative society was the highest in Gujarat (92.24 per cent) followed by Karnataka (82.60 per cent) and Punjab (61.8 per cent). All the buffalo milk produced in Tamil Nadu was sold in cooperative society (100 per cent) followed by 77.35 per cent of buffalo milk sold in Gujarat & 49.21 per cent in AP.*
- *The average net income realised by the selected households was the highest for buffalo milk sold by the selected households in Rajasthan, Maharashtra and Gujarat. The negative return was reported by the local cow owners in the states of Madhya Pradesh, Punjab, Maharashtra, West Bengal, Tamil Nadu, Haryana and Bihar. High margins for buffalo dairy producers may be due to high rate of sales price as compared to the rate for per litre of milk realised for the local cows and cross bred cows.*
- *The cost of milk production per litre for the local cows was estimated to be the lowest in Gujarat (Rs. 29.8/litre), Andhra Pradesh (Rs. 29.9/litre) and Karnataka (Rs. 30/litre), while same was estimated be the highest in West Bengal (Rs. 56.4/litre) followed by Punjab (Rs. 56.2/litre) and Maharashtra (Rs. 49.8/litre).*
- *The low productivity of local cows is a serious constraint to dairy development. While in case of cross bred cows, the lowest cost of milk production was estimated in the state of Rajasthan (Rs. 19/litre) and Maharashtra (Rs. 19/litre) while same was the highest in Assam (Rs. 43.3/litre). Buffalo milk production cost was estimated to be the lowest in Karnataka (Rs.23.3/litre) and Rajasthan (Rs. 24.3/litre) and the highest was in Assam (Rs. 56.6/litre). The productivity of dairy animals could be increased by cross breeding low-yielding non-descript cows with high-yielding selected indigenous pure breeds or suitable exotic breeds in a phased manner. Upgrading non-descript buffalo through selective breeding with high-yielding pure breeds should be given high priority in all areas where buffalo are well-adapted to the agro-climatic conditions.*
- *Feeding cost accounted for 73 to 76 per cent of total variable cost of milk production in all three types of livestock. Feeding cost was found to be highest in Karnataka, Andhra Pradesh, Haryana, Madhya Pradesh and Bihar. West Bengal reported lower share of*

fodder in total cost of milk production which may be due to higher labour cost share in total variable cost and no proper feeding and grazing practices. In case of Punjab, the supplements costed more ranging from Rs. 95.50 per kg to Rs. 114.50 per kg which might be due to variants of concentrates/supplements, farmers fed to their animals. The price of concentrates during the summer season was found relatively less than that in winter and rainy seasons which might be due to the large availability of cereals grains forages, etc. The return per litre was reported highest for buffalo followed by that for crossbreed cows, while in case of local cows, same was meagre or negative.

- The improvement in net income per unit of production is possible by adopting different strategies of reduction in fodder cost and increase in milk yield through various interventions through various policy formulations. The sensitivity analysis highlights that not all states and not for all breeds are the results same for increase in milk yield or reduction in fodder cost taken together.
- The estimated breakeven point for the milk producers during lactation period indicates that break-even output of milk was largely low in case of buffaloes and was high for cross bred cows during the lactation period. The high rate of milk for buffaloes resulted in lower levels of BEP as compared to the cross bred and local cows. During the cycle period, break even output increased while trend was observed to be the same across breeds and groups during lactation. Wherever the negative BEP are recorded, it indicates less productivity level and may be low per litre rate of sale.
- BEP quantity indicates only that quantity of milk during lactation / dry period that would cover fixed costs (as variable cost is already covered directly from sales price). Thus, when variable cost is more than selling price, BEP cannot be estimated. Thus, cost on labour and fodder which are important determinants of economics of milk production are actually disguised costs, not paid and are major hidden cost. Because of this reason, dairy households continue in dairy without realising the actual economics of same.
- The majority of sample households in the states of Gujarat, Assam, Haryana, Punjab, West Bengal, and Tamil Nadu have mentioned that high feed cost was a major constraint (agree+ strongly agree responses), while veterinary cost and services was major constraint in milk production in Rajasthan, Andhra Pradesh, Bihar and even in Punjab. Non availability of fodder was faced by the sample dairy owners in Rajasthan, Assam, Punjab, West Bengal and Tamil Nadu. The other constraints faced by the sample milk producers were lack of finance to invest in dairy business for quality milk production/inadequate finance, low average milk yield of animals and poor knowledge about feeding and health care were major constraints in milk production.
- The selected dairy households had faced the constraints in the form of high cost of feed and mineral mixtures, non-availability of seed either on credit or at dairy cooperative. Noticeably high cost of cattle feed and mineral mixture was the biggest constraint faced.

Conclusions and Suggestions:

- Dairy industry can serve as a cushion in the form of continuous flow of income as an industry complementary to the agricultural sector. While both agriculture and dairy industry if simultaneously operate it can improve not only farmer's income but also compensate for unexpected losses faced due to agriculture especially for poor, small and marginal farmers. Besides such complementarity protects against seasonal and disguised

unemployment and acts as a shield to protect farmer against the negative impact of climate change on agriculture.

- *Fodder forms a major component of the variable cost in the dairy industry. If the feed and fodder cost is reduced through RBP, it can result in improvement in net income and reduce the BEP quantity. Hence fodder community farming farms should be encouraged, benefits assessed, and should be effectively communicated to the dairy farmers. Co-operative farming of fodder, particularly on the barren land of the village, can assure sufficient local availability of the fodder, and can thereby reduce the major proportion of variable cost.*
- *The rearing of local cows for milk production can be made viable by increasing the milk rate/prices given to the milk producers or wherever the production environment suits, the milk yield needs to be improved. Increase in yield by any means can create a positive impact on improvement in net income and reduce the BEP quantity.*
- *The crossbred animals and buffaloes are economically viable in most of the regions. But if the productivity of these animals does not maintain if not increase it is likely that in the times to come, the returns will not be even sufficient to cover the rising feed and fodder costs.*
- *Improvement in nutritional rationed balanced diet can create a positive impact on yield thereby improving net income and reducing the BEP quantity.*
- *If the numbers of lactation days in a cycle are increased (through reducing dry period/milking interval or through scientific rearing/management), it can create a positive impact on yield thereby improving net income and reducing the BEP quantity.*
- *Field observations indicated that dairy farmers need to be educated that rather than purchasing a lactating animal it would be better to rear a calf. Rearing a calf closer to the mother improves the mental health (by reducing the stress levels of the calf since it is closer to the mother) and physical health of the calf (since it is entirely in the control of farmer, how to rear the calf carefully). Subsequently, compared to the cost of rearing calf, the returns from the calf once it enters the lactation may be expected to be higher.*
- *As observed during the primary data collection that if the resources are adequate, it would be beneficial for the dairy farmers to add additional livestock beyond two animals in the herd. Resource efficiency between group of farmers can also create a positive impact on net income and reduce the quantity of BEP.*
