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Economics and constraints of milk production in Chandrapur district of Maharashtra

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Abstract

The present study estimated the maintenance cost and returns of cow and buffalo milk production and constraints during milk production in Chandrapur district, Maharashtra. Primary data for 2025 were collected from 120 randomly selected milk producers (60 buffalo and 60 cow) across four villages in two tahsils, through personal interviews using a pre-tested schedule and analyzed using standard cost concepts and frequency-percentage method. Results showed that although annual maintenance cost was higher for buffaloes (₹91,939.47) than cows (₹82,998.51), buffaloes yielded more milk (2,050.52 litres) at a higher price (₹70.30/litre), resulting in higher net return (₹76,555.67 vs. ₹32,558.94), better input-output ratio (1.81 vs. 1.39), and lower per-litre cost (₹41.89 vs. ₹50.99)—confirming buffalo rearing as more profitable. Major constraints included shortage of grazing yard (95.00%/93.33%), labour shortage (86.67%/80.00%), high animal and concentrate costs, improper waste disposal, and inadequate feeding knowledge. Better access to grazing/fodder, labour support, cost-effective feed.

Keywords: Dairy farming, maintenance cost, net returns, input-output ratio, cow, buffalo

Introduction

Livestock farming is a vital pillar of India's rural and agricultural economy, offering income, employment, and financial security to millions of households, particularly small and marginal farmers, landless labourers, and women. Unlike seasonal crop farming, it provides a steady, year-round income source, with dairy farming standing out as a key contributor—directly employing over eight crore farmers nationwide. The sector's economic weight is substantial, contributing roughly 31% of Agricultural GVA and about 5.5% of national GVA, acting as a stabilizing force during economic fluctuations. Historically, pre-independence dairy farming in India was informal and low-yielding, hampered by poor breeding, weak veterinary support, and disorganized marketing, with annual milk production standing at just 17 million tonnes at independence. Post-independence reforms—especially the 1970 White Revolution led by Verghese Kurien and the cooperative model pioneered by Amul—transformed India into the world's largest milk producer. By 2024–25, production had surged to 247.87 million tonnes, with per capita availability rising from 124 to nearly 485 grams per day. Globally, India leads milk production with a 25% share, followed by the USA, Pakistan, China, and Brazil. Within India, Uttar Pradesh and Rajasthan dominate state-level output, together contributing over 30% of national production. Maharashtra, too, plays a significant

dairy role, with production rising from 101.52 lakh tonnes (2015–16) to 166.26 lakh tonnes (2024–25). Within the state, Chandrapur district exemplifies a mixed farming system integrating crop and livestock production, with both cattle and buffalo rearing contributing to household income. However, farmers here face challenges including high feed costs, inadequate veterinary services, and price fluctuations—making comparative profitability analysis between cow and buffalo milk production essential for understanding the sector's economic dynamics at the local level.

Objective

1. To estimate the maintenance cost and returns of Cow and Buffalo milk production
2. To identify the constraints faced by milk producer

Methodology

For the present study, Chandrapur district of Vidarbha region of Maharashtra was selected purposively. Chandrapur district consists of fifteen tahsils, of which two tahsils were selected for the study. From each selected tahsil, two villages were selected, resulting in a total of four villages for the present study. A sample of 120 milk producers was selected randomly from the selected villages of the two tahsils of Chandrapur district. The sample comprised 60 buffalo milk

producers and 60 cow milk producers. From each village, 15 buffalo and 15 cow milk producers were selected. The primary data were collected by survey method through well - defined pre- tested schedule by personal interview of the selected milk producers. The data pertained to the calendar year -2025

Analytical tools and technique

Cost concept

Total fixed cost: Depreciation (cattle shed, equipment's) + Interest on fixed cost (@ 10%).

Total Variable cost: Feed cost + Labour cost + Veterinary cost + Miscellaneous cost + Interest on working capital (@ 12%) per annum

Total cost = Total fixed cost + Total Variable cost

Income concept

a. Gross income

1. Receipt from sale of milk.
2. value of milk utilization for home consumption.
3. Value of manure.
4. Value of new born calf after deducting rearing expenditure.

b. Net returns

It was calculated for per animal.

1. Net returns at variable cost = Gross Return – Variable cost
2. Net returns at total cost = Gross Return – Total cost

c. Cost of milk production

Average per litre cost of milk production was calculated as under

Average per litre cost of milk at variable cost =

$$\frac{\text{variable cost} - \text{value of by product}}{\text{Total litre of milk}}$$

and other all receipts except value of milk

Total litre of milk

Average per litre cost of milk at total cost =

$$\frac{\text{Total cost} - \text{value of by product} - \text{and other all receipts except value of milk}}{\text{Total litre of milk}}$$

Input output ratio at variable cost = $\frac{\text{Gross Return}}{\text{Variable cost}}$

Input output ratio at Total cost = $\frac{\text{Gross Return}}{\text{Total cost}}$

Problem faced by milk producer

Frequency and percentile techniques were used to identify the problem faced by milk producers

Results and Discussion

1. Maintenance cost and returns of buffalo and cow milk production

Table No. 1 presents the annual maintenance cost of milk buffaloes and cows, expressed in rupees per animal per year. The total variable cost was ₹78190.04 for buffaloes and ₹69463.48 for cows, accounting for 85.05 and 83.69 per cent of the respective total costs. Among the variable cost components, concentrate feed constituted the largest share, followed by dry fodder and human labour in both enterprises. The fixed cost was ₹13,749.43 per buffalo and ₹13,535.03 per cow, representing 14.95 and 16.31 per cent of the total cost, respectively. Depreciation on fixed assets was ₹7,833.20 for buffaloes and ₹8,356.59 for cows, while interest on fixed capital was ₹5,916.23 and ₹5,178.44, respectively. The expenditure on medicine and vaccines was higher for cows, whereas buffaloes incurred higher costs on human labour, electricity and feed components. Overall, the annual total maintenance cost was ₹91,939.47 per buffalo and ₹82,998.51 per cow. Thus, the cost of maintaining a buffalo was higher than cow. The higher total cost of buffalo maintenance was mainly associated with greater expenditure on feed, labour and other variable inputs, indicating that buffalo production required comparatively higher annual maintenance expenditure.

Table 1: Annual maintenance cost of buffalo and cow (Cost in Rs. / Animal / Year)

Sr. No.	Particulars	Buffalo	Cow
A	Variable cost		
1	Feeds		
a	Dry fodder	19975.97 (21.73)	16957.55 (20.43)
b	Green fodder	11869.43 (12.91)	9938.27 (11.97)
c	Concentrate	27586.34 (30.00)	25417.81 (30.62)
d	Supplement	1106.30 (1.20)	1259.41 (1.52)
2	Human labour	7596.53 (8.26)	6442.91 (7.76)
3	Medicine & vaccine	762.08 (0.83)	1505.30 (1.81)
4	Electricity Charge	697.92 (0.76)	244.08 (0.29)
5	Breeding	64.98 (0.07)	49.86 (0.06)
6	Misc. charges	207.17 (0.23)	45.12 (0.05)
7	Working cost	69866.72 (75.99)	62020.96 (74.73)
8	Interest on working	8323.32	7442.52

	capital (@ 12%)	(9.05)	(8.97)
9	Total variable cost	78190.04	69463.48
		(85.05)	(83.69)
B	Fixed cost		
10	Depreciation on fixed cost	7833.20	8356.59
		(8.52)	(10.07)
11	Interest on fixed capital (@ 10%)	5916.23	5178.44
		(6.43)	(6.24)
12	Total fixed cost	13749.43	13535.03
		(14.95)	(16.31)
	Total cost	91939.47	82998.51
		(100.00)	(100.00)

Table No. 2 presents the cost, returns and profitability of milk production from buffalo and cow. The total cost of production was ₹91,939.47 per buffalo and ₹82,998.51 per cow, comprising variable costs of ₹78190.04 and ₹69463.48, respectively. The annual milk production was 2,050.52 litres from buffalo and 1,645.53 litres from cow, with an average milk price of ₹70.30 and ₹61.30 per litre, respectively. The total gross return was ₹1,65,358.48 per buffalo and ₹1,15,557.45 per cow. The value of milk constituted the major component of gross return, while additional income was obtained from manure and young stock. The net return

over total cost was ₹76,555.67 for buffalo and ₹32,558.94 for cow, indicating substantially higher profitability from buffalo milk production.

The average cost of milk production at total cost was ₹41.89 per litre for buffalo compared with ₹50.99 per litre for cow. The input-output ratio at total cost was 1.81 for buffalo and 1.39 for cow, while at variable cost it was 2.12 and 1.67, respectively. Thus, buffalo milk production was found to be comparatively more profitable and economically efficient than cow milk production in the study area.

Table 2: cost, returns and profitability of milk production from buffalo and cow

Sr. No.	Particular	Buffalo	Cow
1	Cost		
	Variable cost	78190.04	69463.48
	Fixed cost	13749.43	13535.03
	Total cost	91939.47	82998.51
2	Gross return		
	Total milk production	2050.52	1645.53
	Rate of milk per lit. (Rs)	70.30	61.30
	Value of milk	149101.02	100869.97
	Income from manure	8342.46	7822.09
	Value of young stock (Rs.)	7925.00	6865.39
	Total Gross return (i+ ii +iii)	165368.48	115557.45
3	Net return at variable cost	89829.74	46093.97
4	Net return at total cost	76555.67	32558.94
5	Average per lit. of cost of milk production at variable cost	35.63	42.27
6	Average per lit. of cost of milk production at total cost	41.89	50.99
7	Input-output ratio at variable cost	2.12	1.67
8	Input-output ratio at total cost	1.81	1.39

2. Problems faced by milk producer

Table No. 3 presents the major problems faced by buffalo and cow milk producers during milk production. The most common problem was shortage of grazing yard, reported by 95.00 per cent of buffalo producers and 93.33 per cent of cow producers. Labour shortage was another major constraint, affecting 86.67 per cent of buffalo producers and 80.00 per cent of cow producers. High prices of crossbred animals were reported by 68.33 per cent of buffalo producers and 56.67 per cent of cow producers.

Among other constraints, high cost of concentrates was reported by 55.00 per cent of buffalo and 66.67 per cent of cow producers, while improper disposal of animal waste was reported by 51.67 and 60.00 per cent, respectively. Inadequate knowledge about balanced feeding was reported by 48.33 per cent of both buffalo and cow producers. Overall, shortage of grazing yard and labour shortage were the most prominent production-related problems faced by the milk producers.

Table 3: Problems faced by buffalo and cow milk producer during milk production

Sr. No.	Particulars	Buffalo		Cow	
		Frequency	Percentage	Frequency	Percentage
1	Shortage of grazing Yard	57	95.00	56	93.33
2	High price of crossbreed animals	41	68.33	34	56.67
3	Inadequate knowledge about balance feeding	29	48.33	29	48.33
4	Improper disposal of animal waste	31	51.67	36	60.00
5	Labour shortage	52	86.67	48	80.00
6	High cost of concentrates	33	55.00	40	66.67

Conclusion

The study found buffalo milk production to be more profitable than cow milk production. Although the annual maintenance cost was higher for buffaloes (₹87,777.81) than cows (₹79,277.26), buffaloes yielded more milk (2,050.52 litres) at a higher price (₹68.06/litre) than cows (1,645.53 litres at ₹58.24/litre), resulting in a higher net return (₹75,835.66 vs ₹31,257.15) and better input-output ratio (1.84 vs 1.40) at total cost. Accordingly, the per-litre cost of production was lower for buffaloes (₹39.99) than for cows (₹48.71), confirming buffalo rearing as the more economically efficient enterprise. However, producers of both species faced common constraints, chiefly shortage of grazing yard (95.00% for buffalo, 93.33% for cow) and labour shortage (86.67% and 80.00%, respectively), along with high prices of crossbred animals, high concentrate costs, improper waste disposal, and inadequate knowledge of balanced feeding. Addressing these constraints through better access to grazing and fodder, labour support, cost-effective feed, proper waste management, and farmer training would help improve milk production efficiency for both enterprises.

Policy Implication

1. The cost of feed and fodder accounts for the largest share of maintenance expenditure, while inadequate grazing land remains the major production constraint. Hence, fallow and barren lands should be utilized for green fodder cultivation, with emphasis on drought-tolerant and summer-resistant varieties to ensure a regular supply of fodder throughout the year.
2. Azolla, hydroponic fodder and multi-cut fodder crops should be promoted on small landholdings to meet feed requirements and reduce livestock feeding costs.

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