



A Comprehensive Economic Analysis of Production and Maintenance Cost of Per Milch Animal Buffaloes of Ghazipur District of Uttar Pradesh, India

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

This study analyzes milk marketing in the Bhanwarkola and Ghazipur Sadar Blocks of Ghazipur District, Uttar Pradesh, focusing on the various channels for selling milk. It categorizes cattle owners, studies demographic patterns, and links these variables to milk marketing methods and efficiency. Using a descriptive and analytical design, the study divides cattle owners into small, medium, and large-scale enterprises. It evaluates demographic data such as age, gender, education, and social categories, as well as a thorough review of milk marketing methods and associated expenses. Data were gathered through biennial personal interviews done on a predetermined timetable, with an emphasis on production costs such as feed, fodder, labor, and

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animal care. The statistics suggest that the overall average production cost for desi buffaloes is Rs. 50,519.65 and Rs. 56,857.32 for murreh buffaloes, giving policymakers and dairy farmers vital insights into increasing profitability and sustainability.

Keywords: Production; maintenance costs; cattle ownership; Gazipur; milch animal buffaloes.

1. INTRODUCTION

The dairy business places a lot of importance on the marketing of liquid milk. A significant amount of liquid milk is sold by private sellers or vendors, also referred to as "dudhias." Although they are highly well-liked in cities, most urban consumers are unaware of the degree and type of dilution techniques used by the bulk of milk dealers [1]. On the other hand, the farmers in the villages were typically the ones dealing with other issues including loans for the purchase of milch animals, lengthy marketing channels, a larger middlemen profit, a shortage of transportation, and chilling centres. One of the key tactics for changing the terms of trade in favor of agriculture under the new agricultural policy implemented in India in July 2020 is dairy marketing and market development [2,3]. The price of processed milk and raw milk is predicted to climb, which will cause the dairy industry to grow and industrialize through higher capital expenditures for infrastructure, technical and institutional development in rural regions, and dairying operations [4,5,6].

The new, developing trend in the dairy industry aims to connect dairy producers at the local, national, and international levels with intricate networks of transportation, institutions, technology, and refrigerated storage as well as with consumers in a quick and effective manner [7,8]. During the COVID-19 period, it may be possible to double farmers' income and help the rural populace become more self-sufficient and independent through the Government of India's Atmanirbhar (self-reliance) mission [9,10,11]. Furthermore, while marketing and production practices and the level of stakeholder integration are consistent across the nation, there are regional and intra-regional variations in response to the socioeconomic, ecological, demographic, and political characteristics of the various regions [12,13]. There seems to be a pressing necessity to recognize the marketing and distribution strategies for milk and the products it produces, as well as how they affect the growth of dairy farming locally and regionally, in order to create a trade system that benefits both farmers and consumers while being effective and profitable

[14,15]. Furthermore, the nation is moving toward "shining Indian dairying" through significant capital expenditures for the construction of institutional facilities such as veterinary hospitals, staff members who provide animal health care at the village panchayat level, EXIM facilities, and incentive-providing organizations at both the federal and state levels; and basic infrastructure facilities like link roads, assembling depots, chilling storage, and transportation [16,17,18].

Due to a variety of factors, including differing geographic and ecological conditions, the nature of the socioeconomic structures of producers and consumers, and variations in the degree of urbanization, income, sex ratio, education, and dominating species of dairy animals, the nation's production and marketing of milk and milk products are unevenly developed [19,20]. There is an urgent need to formulate strategies to achieve targeted development of dairy farming as a means of doubling farmers' income and achieving rural Atmanirbhar, or self-reliance. This can be achieved by conducting comparative analyses at the state and district level of dairy farming, marketing, processing, production, consumption, and development of allied activities, income, and employment [21]. The goal of this study is to determine the current state of dairy product production and marketing in Uttar Pradesh. Keeping in view improving the economic condition of small, marginal and landless households and providing the milk to the consumers at cheaper rate directly this study was conducted.

2. MATERIALS AND METHODS

This research employs a descriptive and analytical design to explore various aspects of milk marketing and cattle ownership. The study was conducted in the Gazipur District, Uttar Pradesh, focusing on the current state of cost of production of milk. The methodology includes a survey of cattle owners in the gazipur, classifying them into small, medium, and large-scale operations based on the number of cattle owned. The study also assesses the age, gender, education level, and social categories of cattle owners, alongside a comprehensive analysis of

milk marketing channels, including costs, and market efficiency. Primary data were obtained from the sample milk producers using the survey approach through direct personal interviews conducted twice a year using a pre-tested schedule. The purpose of the inquiry was to gather information regarding the cost of producing milk, the cost of variable inputs such as feed and fodder, or roughages, green feed such as bajra Chari, maize chari, cow pea chari, berseem chari, and green grass chari. Dry feed such as paddy straw, wheat bhusa, concentrate such as wheat bran, corn kernels, linseed cake, brawn, chunni, arhar chunni, salt, and mustard oil the cost of labour (both family and hired), the cost of veterinary care, and other recurring costs and returns related to the production and sale of milk. A list of the villages of these two selected blocks has been prepared with the help of block personnel and five villages from each block have been selected randomly. Thus 10 villages have been selected for the study. In the next stage all the milk producers of these 10 villages have been categorised into three size groups based on the number of milch animal i.e. Small (1 milch animal), medium (2-3 milch animals) and large (4 and above milch animals). Milk producers from each category have been selected randomly for in-depth study. Finally, 150 milk producers have been selected as the ultimate sample unit of the study.

3. RESULTS AND DISCUSSION

3.1 Production and Maintenance Cost of Per Milch Animal Buffaloes

“The various cost components including in rearing of a milch cow per day for different categories of household have been given in Table 1. The total cost of milk production per milch animal buffaloes (desi/murrah) per day on small, medium, and large households; category was estimated having Rs.131.04 and Rs.140.68 Rs.143.47 and Rs.160.14, and Rs.155.04 and Rs.180.8, respectively with an overall average was Rs.138.41 and Rs.155.773. The fodder cost was the most important item of total maintenance cost accounting for maximum on large Rs.52.86 and Rs.58.78, medium Rs.48.72 and 54.70 and small Rs. 45.51 and Rs.48.13 with on overall average having Rs. 47.59 and 52.52, respectively whereas maximum is concentrate estimated in large Rs. 21.60 and Rs. 25.98 followed by medium Rs. 20.70 and 23.48, small Rs. 19.66 and 20.65 with an overall average having Rs. 20.27 and 22.72 in both buffaloes

(desi/murrah), respectively. The labour cost was recorded maximum in case of large households followed by medium, and small, category of households. The Veterinary charges were found highest for large Rs. 7.30 and 9.57, followed by medium and small households, respectively i.e., Rs 6.96 and 7.28, 6.48 and 1.76. The fixed cost was decreasing at increasing trend with the small, medium, and large category of households, whereas an overall average was found Rs. 5.54, and Rs. 6.57. The overall variable cost was recorded Rs. 132.87 and 149.201 along with overall costs” [1].

“The different items considered in the production and maintenance costs are given in Table 2. It was observed that total production and maintenance cost in buffalo (desi) per annum was highest in Rs. 18984.93 and lowest Rs. 23498.20 in case of large households and small households respectively. It was further observed that the total production and maintenance costs were also found highest Rs. 19380.48 for large household and lowest Rs. 28516.66 for small in the case of buffalo(murrah). Total cost was observed in the buffalo(des) Rs.23498.20,29122.80 and 18984.93 whereas in case buffalo(murrah) was Rs.28516.66, Rs.35027.70, and Rs. 19380.48 for small, medium, and large, households, respectively” [1].

Among various categories of milch animal the fodder cost was highest for large household Rs. 19293.9 and Rs.21443.75 and lowest for small Rs.16611.5 and Rs.17567.45. The concentrates cost was found highest for large household Rs. 7884.00 and Rs.9482.7 lowest for small Rs.7175.9 and Rs.7537.25 in the case of buffalo(des/murrah) whereas, the labour charges was highest for large and medium households Rs. 9070.25 and Rs.10293.00, and 7989.85 and 9000.9 respectively except to small Rs. 7902.25 and Rs. 6927.7 and Veterinary charges was found highest Rs.2664.5 and 3493.05, and Rs. 2540.4 and Rs. 2657.2 for large and medium households, respectively and lowest Rs.2365.2 and Rs. 2467.4 for small households. The results revealed overall average cost was Rs. 50519.65 for buffalo (desi) and Rs. 56857.32 for buffaloes (murrah).

Per day returns from milk production on all the categories of buffalo (desi/murrah) are given in Table 3. On an average the gross returns from large household of was highest Buffalo(des)

Table 1. Production and maintenance cost of per milch animal Buffaloes (desi/murrah) per day in Rs

S. No.	Particulars	Buffalo(deshi)			Buffalo(murrah)			Overall	
		Small	Medium	Large	Small	Medium	Large	Buffalo (deshi)	Maurrah
1.	Dry Fodder	27.82	29.83	32.61	29.63	32.50	35.65	29.15	31.88
2.	Green Fodder	17.69	18.89	20.25	18.50	22.20	23.10	18.44	20.64
3.	Concentrate	19.66	20.70	21.60	20.65	23.48	25.98	20.27	22.72
A	Grain	7.92	8.79	9.97	8.55	10.89	11.55	8.49	9.93
B	Khali	9.89	10.19	11.09	10.03	11.09	12.85	10.16	11.00
C	Chuni/Choker	9.82	10.95	12.25	10.79	12.22	15.29	10.53	12.27
4.	Mineral Material	7.93	8.29	8.99	8.20	8.86	10.65	8.2	8.97
5.	Labor Charge	18.98	21.89	24.85	21.65	24.66	28.20	20.74	24.07
6.	Veterinary Charges	6.48	6.96	7.30	6.76	7.28	9.57	6.75	7.58
7.	Variable Cost Total	126.1	137.4	147.9	135.0	153.1	172.8	132.8	149.2
8.	Fixed Cost	4.85	5.98	7.13	5.65	6.96	7.96	5.54	6.57
	Grand Total (variable+fixed)	131.0	143.4	155.0	140.6	160.1	180.8	138.4	155.7

Table 2. Production and maintenance cost of per milch animal Buffaloes (desi/murrah) per annum in Rs

S.N	Particulars	Buffalo (Desi)			Buffalo (Murrah)			Overall	
		Small	Medium	Large	Small	Medium	Large	Buffalo(desi)	Buffalo (murrah)
1.	Dry Fodder	10154.3	10887.95	11902.6	10814.9	11862.5	13012.2	10639.75	11636.2
2.	Green Fodder	6456.85	6894.85	7391.25	6752.5	8103	8431.5	6730.6	7329.2
3.	Concentrate	7175.9	7555.5	7884	7537.25	8570.2	9482.7	7398.55	8088.4
A	Grain	2890.8	3208.35	3639.05	3120.75	3974.85	4215.7	3098.85	3522.25
B	Khali	3609.85	3719.35	4047.85	3660.95	4047.85	4690.2	3708.4	4015
C	Chuni/Choker	3584.3	3996.75	4471.25	3938.35	4460.3	5580.8	3843.45	4467.6
4.	Mineral Material	2894.45	3025.85	3281.35	2993	3233.9	3887.2	2993	3274.05
5.	Labor Charge	6927.7	7989.85	9070.25	7902.25	9000.9	10293	7570.1	8785.55
6.	Veterinary Charges	2365.2	2540.4	2664.5	2467.4	2657.2	3493.05	2463.75	2766.7
7.	Variable Cost Total	46059.35	50183.85	53987.15	49285.9	55910.7	63086.6	48497.55	54458.31
A	Depreciation on cattle equipment/asset	369.45	485.22	603.51	476.14	496.3	631.6	439.70	519.01
B	Depreciation on animal	518.59	709.19	827.64	664.01	742.5	856.4	622.41	732.19
C	Interest on fixed capital	882.21	988.29	1171.3	922.10	1301.6	1417.4	958.16	1147.79
8.	Fixed cost	1770.25	2182.7	2602.45	2062.25	2540.4	2905.4	2022.1	2398.05
	Grand total (v+f)	47829.6	52366.55	56589.6	51348.2	58451.1	65992	50519.65	56857.3

Table 3. Cost and returns of Milk Production of per Milch animal Per day

S. No.	Particulars	Buffalo(desai)			Buffalo (murrh)			Average	
		Small	Medium	Large	Small	Medium	Large	Buffalo (desi)	Buffalo (murrh)
1.	Total cost of Production (Rs.)	131.04	143.47	155.04	140.68	160.14	180.8	138.41	155.77
2.	Milk Yield (litre)	6.45	8.03	11.50	9.15	12.04	14.65	7.697	11.28
3.	Price of Milk (Rs)	45	45	45	50	50	50	45	50
4.	Value of Dung	3.74	3.74	3.74	4.92	4.92	4.92	3.74	4.92
	Value of Calf	16.43	16.43	16.43	21.91	21.91	21.91	16.43	21.91
5.	Gross Return	310.42	381.52	537.67	484.33	628.83	759.33	141.72	362.43
6.	Net Profit	179.38	238.05	382.63	343.65	468.69	578.53	88.20	266.89
7.	B:C Ratio	1:1.36	1:1.65	1:2.46	1:2.44	1:2.92	1:3.19	1:1.60	1:2.71

Rs. 537.67 and it decreased from medium to small households. However, in the case of buffalo (murrh), the gross return from large household was also highest Rs. 759.33 followed by medium and small size of households respectively. Overall, the gross return in case of buffalo (desi) was Rs. 141.72 and buffalo(murrh) was Rs.362.43. The input-output ratio in milch buffalo(desai) was highest on large 1:2.46 size group followed by small and medium while in case of buffalo(murrh) input-output ratio was also highest on large 1:3.19 size groups followed by small and medium households, respectively. On an average input-output ratio in milch buffalo(desai) was highest on large 1:2.46 followed by medium 1:1.65, and small 1: 1.36 household. In the case of buffalo (murrh) input-output ratio was also highest on large 1:3.19 followed by medium 1:2.92 and small 1:2.44 size groups of households

4. CONCLUSION

The findings of present study concludes that the concentrates cost was found highest for large household Rs. 7884.00 and Rs.9482.7 lowest for small Rs.7175.9 and Rs.7537.25 in the case of buffalo(desai/murrh) whereas, the labour charges was highest for large and medium households Rs. 9070.25 and Rs.10293.00, and 7989.85 and 9000.9 respectively except to small Rs. 7902.25 and Rs. 6927.7 and Veterinary charges was found highest Rs.2664.5 and 3493.05, and Rs. 2540.4 and Rs. 2657.2 for large and medium households, respectively and lowest Rs.2365.2

and Rs. 2467.4 for small households. The results revealed overall average cost was Rs. 50519.65 for buffalo(desai) and Rs. 56857.32 for buffaloes(murrh).

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Author(s) hereby declare that generative AI technologies such as Large Language Models, etc have been used during writing or editing of manuscripts. This explanation will include the name, version, model, and source of the generative AI technology and as well as all input prompts provided to the generative AI technology.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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