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Cost and Input-Output Connection Associated With Production of Milk in Maharashtra State

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Abstract

The present study was undertaken in order to understand the economics of cow and buffalo milk production in four districts of Maharashtra State during 2024 was calculated for 240 milk producers selected randomly. From each district three villages were selected and from each village 20 dairy farmers were selected randomly. The analysis input-output ratio were separately carried out using tabular analysis for cow and buffalo per animal per year, the total cost(Fixed cost + variable cost) and total income was calculated. The total cost of per animal per year was Rs.1, 31,249.85. In which fixed cost, variable cost and herd replacement cost was included. Green Fodder, dry fodder and concentrates were the three major cost elements which constituted about 80 per cent of the total maintenance cost. The total Income from per animal per year was Rs.1, 73,128. So, Net income was Rs. 41,878.15 per animal per year. It was noticed that the input-output connection ratio was 1:1.32. It means for every unit of input a dairy farm produces 1.32 units of milk output, which shows greater efficiency of dairy farming and farm producing more milk for per unit of input cost in state of Maharashtra.

Keywords: Operation flood programme, Milk production, Fixed cost, Variable cost, Total cost, Herd replacement cost, Net profit, Input-Output ratio.

Introduction

Dairy co-operatives are the most well managed industries in the Indian economy as a result of the Operation Flood Program's contribution to the socio-economic development of rural milk producers. India's milk availability increased from 291g per day per person in 2010–11 to 137.7 grams per day in 2013–14,459 grams in 2023 and 471 grams in 2024. An increase of 4% in milk production (Source: Annual Report 2023-24, Department of Animal Husbandry, Dairy and Fisheries, Ministry of Agriculture, GOI, New Delhi.). Due to the entry of the private sector and multinational corporations, dairy cooperatives are well ahead of the competition, which is seen in a minor way. With a share of more than 10.11% in India's total milk production, Maharashtra is the state with the greatest milk production at 160.45 lakh Tonnes (2023-24.The dairy industry's greatest strength is how labor-intensive it is, with cost effectiveness coming in second. Despite the success stories of farmers many dairy farmers' faces financial challenges. In Maharashtra total number of registered dairy cooperatives: As of December 2024, there were 13,984 dairy co-operatives in Maharashtra. (Source: National Cooperative database).

Earlier studies on economics of milk production (Pant and Karanjkar 1965 Chattraji and Singh 1989 Chand *et al.*, 2002, Kumar 2003 indicated that the share of initial investment on animal remains the highest followed by cattle shed and equipment's.

The input output ratio is a measure of efficiency. It indicates how much output is generated from a given amount of input. The input-output ratio means the criteria for economic viability of the milk based on return per rupee invested. Input-output ratio gives the return per rupee invested. A typical input-output ratio in dairy farming is generally considered be around 0.3 to 0.4 : 1, it means for every unit of input a dairy farm produces 3 to 4 units of milk output. This ratio can vary depending on factors like breed, feeding management and farm efficiency. As per present study, the input-output ratio was 1:1.32 in Maharashtra state. Which shows greater efficiency of dairy farming and farm producing more milk for per unit of input cost?

Objectives of the Study:

- To estimate the cost and input-output connection associated with production of milk in Maharashtra State.

Methodology

The present study was conducted in the Sangali, Solapur, Ahilyanagar and Pune districts of Maharashtra state. From each district three villages were selected and from each village 20 dairy farmers were selected randomly, Thus a sample of 240 dairy farmers were selected purposively which covers south, north, east and central part of Maharashtra. The primary data was collected through personal interview method with the help of structured schedule, specially designed for the study. The secondary information is obtained from internet, journals, newspapers etc. Collected data were classified, tabulated and analyzed by using statistical methods like various costs of milk production and input-output ratio.

Analysis of Data

Capital Investment: The fixed investment on a commercial dairy farm comprised of investment on animals including milch animal, young stock and heifers. Investment on cattle shed and stores, machinery and equipment's.

Herd Replacement Cost: This are the cost of heifers and cows entering the herd less the value of cows culled or sold from the herd, adjusted for herd size.

1. Total Fixed Cost: Depreciation (Cattle shed, equipment's) + Interest on Fixed Cost

2. Total Variable Cost: Feed Cost + Labour Cost + Veterinary Cost + Miscellaneous Cost*

3. Herd Replacement Cost: No. of herd increase by purchase of animal and calving – No.of herd decrease by sale and mortality for one year.

4. Miscellaneous Cost: The cost of repairs, transportation, and water charges etc.

5. Total Cost of Production: Total Fixed Cost + Total Variable Cost + Herd Replacement Cost

6. Net Income:-Total Income- Total Cost

7. Input-Output ratio: Total Income/Total Cost

Results and Discussion

Cost and Return Structure:

The (Table No.-1) reveal that the average capital investment that is, the initial capital investment was Rs. 6, 77,722.59. The share of investment on animal was highest (73.99%) followed by Cattle shed (17.79%) and equipment's (8.22%). Earlier studies on economics of milk production (Pant and Karanjkar 1965, Chattraji and Singh 1989, Chand *et al.*, 2002, Kumar 2003 indicated same that the share of initial investment on animal remains the highest followed by cattle shed and machineries.

The (Table No.-2) reveal that the operational cost of dairy production cost was Rs. 103651.89. The share of operational cost on Dry fodder, Green fodder and concentrate was the highest (83.08%) followed by labour (7.24%), cost of fodder cultivation (3.61%), medicine and insurance (3.45%), miscellaneous (1.39%) and electricity (1.24%). The results are in line with the findings of Chand *et al.,* (2017), Meena *et al.*, (2019) and Rathore *et al.,* (2020).

The (Table No.-3) reveal that, per animal per year cost of milk production. The total fixed cost was Rs.10,158.62 and total variable cost was Rs.1,16091.24 and Herd replacement cost was Rs.5,000 so, totally the per animal per year cost of milk production was Rs.1,31,249.85. The fodder (green and dry) and concentrates were the three major cost components which constituted about 80 per cent of the total maintenance cost. The results are in line with the findings of Maitri Satashia *et al.,* (2021).

The (Table No.-4) reveal that, the gross income received from per animal per year was Rs.1, 73,128.The total income from sale of milk was the highest (83.43 %) followed by sale of calf (10.97%) and sale of manure (5.60%).

The net profit per animal per year was Rs.41, 878.15, which shows positive net income means income was greater than cost and Input-output ratio was 1:1.32, it means for every unit of input a dairy farm produces 1.32 units of milk output. The results are in line with the findings of Chand *et al.,* (2017) Meena *et al.,* (2019) and Rathore *et al.,* (2020).It indicated that an investment worth Rs. 1 on all the inputs used in the production of milk yielded an output worth Rs. 1.32.

Conclusion

Commercialization in dairy farming has kicked in to increase in income levels of farmers through increased production. The average capital investment on sample dairy farm (9 cattle) was calculated to over Rs.6.77 lakh, per farm indicating that dairy farming is a highly capital intensive business. Green Fodder, dry fodder and concentrates were the three major cost components which constituted about 80 per cent of the total operational cost. Hence, these inputs should be made available to the dairy farmers at reasonable prices. It can be

concluded from the analysis that the net income per animal per year was Rs.41,878.15 and input-output ratio was 1.32, it means for every unit of input a dairy farm produces 1.32 units of milk output. Which shows dairy enterprise was profitable business. In study area dairy was only supplementary income to the farmers. Therefore, regular studies on economics of milk production should be carried out which will help in rational pricing policy and also it is needed to make dairy business as a main source of income by encouraging dairy enterprise through bank loans, extension agencies and best policies through government.

Table1: Initial Capital Investment (Per animal)

Sr. No.	Particulars	Total Initial Investment (Considering 9 Cattle) (Rs.)	Average Investment Per animal (Rs.)	Percentage (%)
1	Construction of shed	120555.63	13395.07	17.79
2	Cost of Buffaloes / Cows	5,01,447.96	55716.44	73.99
3	**Machinery and Equipment's** Water structure Chaff Cutter Milking Machine Milking Can Hand Tools	55,719	6191	8.22
Total Initial Investment		**6,77,722.59**	**75,302.51**	**100**

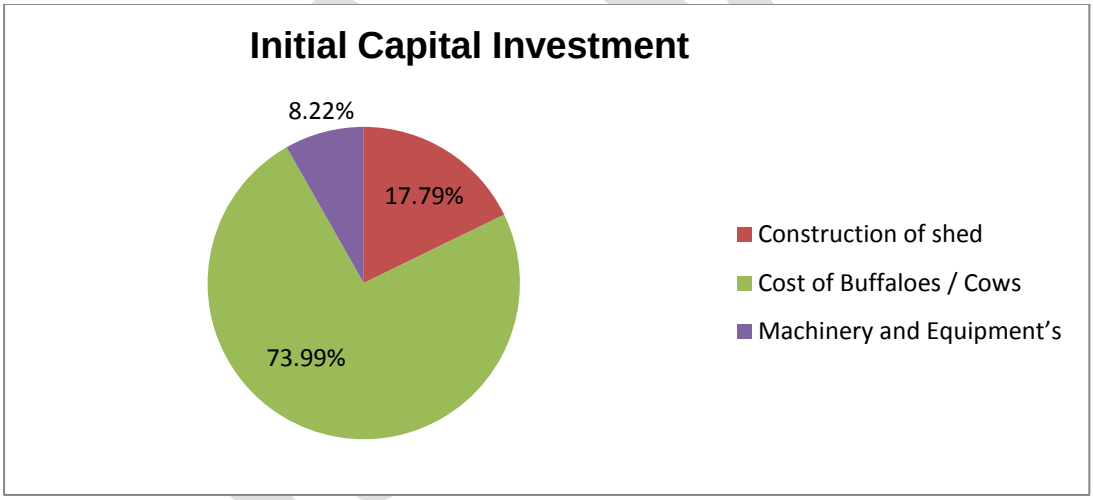


Table 2: Operational Cost of dairy production per animal per year

Sr. No.	Particulars	Total Amount (Rs.)	Percentage (%)
1	Dry Fodder	20383	19.66
2	Green Fodder	28724	27.71
3	Concentrates in Lactation and dry	37009	35.71
4	Medicine & Insurance	3577.78	3.45
5	Cost of Fodder cultivation	3737.08	3.61
6	Labour	7500	7.24
7	Electricity	1283.95	1.24
8	Miscellaneous	1437.08	1.39
Total Operational Cost		**103651.89**	**100**

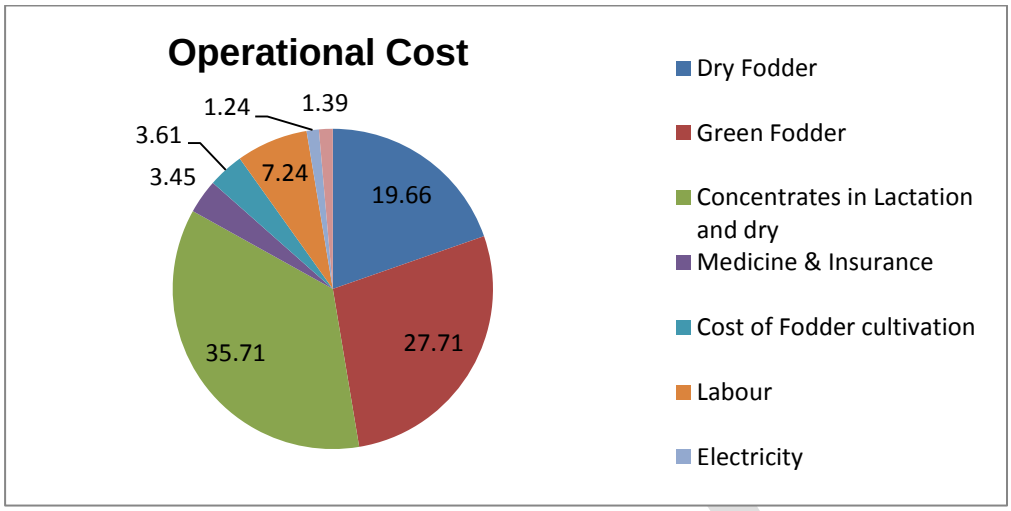
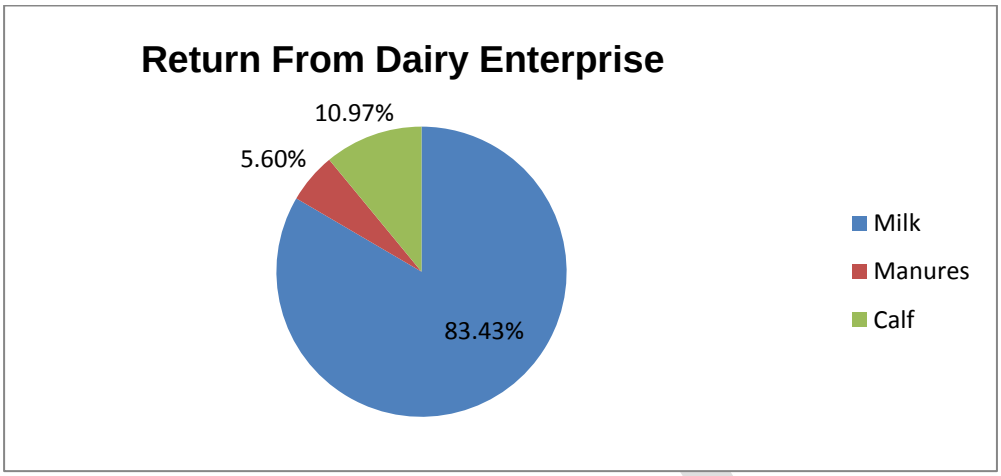


Table 3: Per Animal Cost of Dairy Enterprise

Sr. No.	Particulars	Total Amount (Rs.)	Percentage (%)
A.	**Fixed Cost**		
1	Depreciation on Building @ 15 %	2009.26	1.53
2	Depreciation on equipment @ 10 %	619.10	0.47
3	Interest on Fixed Assets @ 10 %	7530.251	5.74
4	**Total Fixed Cost (Sum of 1 to 3)**	**10,158.61**	**7.73**
B.	**Variable Cost**		
	Feeding during Lactation & dry Period		
5	Dry Fodder	20383	15.53
6	Green Fodder	28724	21.89
7	Concentrates	37009	28.20
8	Medicine and Vaccination	3577.78	2.73
9	Cost of fodder cultivation	3737.08	2.85
10	Labour Charges	7500	5.71
11	Electricity Charges	1283.95	0.98
12	Miscellaneous	1437.08	1.09
13	Total working capital	103652.89	78.97
14	Interest on working capital @ 12%	12438.35	9.48
15	**Total Variable Cost (Sum of 13 to 14)**	**116091.24**	**88.45**
16	**Herd Replacement Cost**	**5000**	**3.81**
Total Cost (14+15+ 16)		**1,31,249.85**	**100**

Table 4: Per Animal per Year Return of Dairy Enterprise

Sr. No.	Particulars	Total Amount (Rs.)	Percentage (%)
1	Milk	144436	83.43
2	Manures	9692	5.60
3	Calf	19000	10.97
4	**Total Income(1+2+3)**	**1,73,128**	**100**
5	**Total Cost**	**1,31249.85**	**--**
6	**Net Profit (4-5)**	**41,878.15**	**--**
7	**Input-output ratio(4/5)**	**1:1.32**	**--**



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