

Running head: BUFFALO MILK PROFITABILITY OF FARMERS

Buffalo Milk Profitability and Economic Analysis in Western Uttar

Pradesh, India

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Abstract

Western Uttar Pradesh was purposively chosen for the study, in which Meerut district which falls in the northern zone was selected. To assess the cost and return of buffalo milk

production in western Uttar Pradesh, a pre-structured questionnaire-based field survey was conducted. To estimate the cost and returns of the budgeting technique for milk production, it was assumed from the study that buffalo rearing was most efficient for the marginal class compared to the small and medium categories. The cost of milk production per litre per annum was lowest in marginal category (Rs. 29.09) than small (Rs. 30.98) and medium (Rs. 30.83). From the present study, it can be concluded that buffalo rearing is more profitable and economical venture for marginal livelihood community as well as small and medium categories of buffalo owners.

Keywords: buffalo, cost and returns and benefit-cost ratio.

Buffalo Milk Profitability and Economic Analysis in Western Uttar Pradesh, India

Buffalo is a livestock species of economic and cultural importance in developing countries. In livestock, buffalo is considered an integral component of the Indian agricultural economy and it has a significant role in livelihood and food security. There are currently 72 buffalo breeds in the world, while Asia has 57 breeds (Mahid et al., 2017). There are 16 registered breeds in India (Anonymous 2018) and they are ranked 1st in the world (Jakhar et al., 2017). Indian buffaloes are today known as a major source of milk. Unlike goats, they yield about three times milk. India's economy is primarily based on agriculture and livestock is a key component of the rural economy. The total population of buffalo of our country is 108.7 million (Anonymous, 2012) contributing 51.06% (74.71 million tons) to the country's total milk production. During 2017-18, milk production peaked at 176.30 million tonnes (Anonymous, 2018). As a result, it becomes a significant secondary source of income for 70 million rural households engaged in dairy work and 70% of women's workforce (Singh et al., 2017).

The milk of buffalo has higher fat, protein, minerals content and about half of the cholesterol content than that of cow's milk. Milk of buffalo is also comprised of high-quality proteins with all the essential amino acids in the appropriate proportions according to the requirement of an individual's body. It is preferred by the consumer as it is rich in nutrition and also can be easily transformed into beneficial commercial products such as yogurt, ice cream, and cheese. Therefore, buffalo rearing is one of the most important occupations of the rural poor rural community has a lower socio-economic condition.

Materials and Methods

Description of the Meerut district

Meerut is the leading district of Uttar Pradesh which is situated between the rivers Ganga and Yamuna, 68 km North-East of Delhi. It is situated between Ghaziabad and Muzaffarnagar district in North and South Moradabad and Haryana in East and West. District Meerut occupies an area of 2590 sq. Kms and it is located at 28 degrees 44` and 29 degrees 18` north latitude and 77 degrees 08` and 78 degrees 47` longitude. The population of the district is 34.44. There are three Tehshils and 12 Blocks and 662 villages. The district is rich in animal resources particularly dairying.

Sampling procedure from the study area

This study involves a comprehensive database of which most are primary with respect to their origin. Keeping in view the limitation of material resources and time factors, the study was conducted using a sample survey method for the collection of relevant information. Sampling design, method of data collection and specification of analytical tools, all these together, constitute the methodological part of the present study.

Sampling design

Purposive cum random sampling technique was used for the selection of district, block, villages, and sample of livestock owners in the ultimate stage of the study. In this study were used multistage sampling technology. In the first stage, the Meerut district of Uttar Pradesh was selected purposively in order to avoid operational inconvenience and Sardar Vallabh Bhai Patel University of Agricultural and Technology, Meerut to taken the technical guidance from university scientists. The second stage, two blocks namely; Hastinapur and Saradhana blocks of Meerut district selected randomly. In the third stage, 12 villages selected randomly from Hastinapur and Saradhana blocks. Thereafter, a list of livestock owners was prepared in ascending order on the basis of the number of livestock and divided into three groups viz., marginal, small, and medium on the basis of the number of livestock. The livestock owner having <1, 1-2, and 2-4 h lands were classified as marginal, small and medium owners, respectively. From this list, a sample of 120 respondents was selected following the proportionate random sampling technique.

Collection of data

The study consisted of both primary and secondary data. For the collection of secondary information, various Government offices and published records were viewed and recorded. However, for the collection of primary field data, the survey method was used. The primary data from 120 sample livestock owners (40 buffalo owners were selected each category) were collected through a well prepared and pretested schedule of inquiry by personal interview technique to pertain various objectives of the study from the sample livestock owners. The data were recorded for the complete lactation period for each and every milch animal.

Analytical tools

Analytical tools used for the analysis and interpretations of the data have been presented below.

Average: The average given refers to the average of the aggregate value. Average was used for the study.

$$\text{Arithmetic mean} = \sum X_i / n$$

Tabular analysis

The tabular analysis was used to compare the different parameters among the marginal, small and medium-size group of the farmer. Investment pattern; buffalo rearing costs and returns etc. computed and presented in tabular forms. In this computation weighted average is used.

$$\text{Weighted mean} = \sum W_i X_i / \sum W_i$$

Where:

X_i = value of an item

W_i = weight of item

Results and Discussion

Production and maintenance cost of per milch buffaloes per day

The various cost attributes including in the rearing cost of a milch buffalo/day for different groups of animal owners are presented in Table 1. The total cost of milk production per milch buffalo per day on marginal, small and medium households; category was estimated having Rs. 25.67, Rs. 26.06 and Rs. 26.09, respectively with an overall average was Rs. 25.94. The price of fodder was the most important item of overall maintenance cost

accounting for the medium class limit (Rs. 19.10), followed by small and marginal items such as Rs. 19.00 and Rs.18.87. Whereas, the highest cost of concentrate was estimated in small groups as Rs. 8.30 as compared to medium (Rs. 8.25) and marginal (Rs. 7.95).

The labour cost was recorded higher in the case of small households followed by medium and marginal as Rs. 4.44, 4.26 and 4.22 with overall average Rs. 4.31, respectively. In the case of veterinary, a higher cost of treatment per animal was recorded in medium category households (Rs. 0.68) followed by small households (Rs. 0.64) and marginal (Rs.0.62) with overall average (Rs. 0.65). The fixed cost was highest recorded in the medium household as Rs. 1.16 followed by small (Rs. 1.12) and marginal (Rs. 1.09) with an overall average (Rs. 1.12).

The total cost of milk production per milch buffalo per day on marginal, small and medium categories was estimated as Rs. 25.67, Rs. 26.06 and Rs. 26.09, respectively with an overall average was Rs. 25.94. The cost of feed was the most important item of overall cost of maintenance or rearing. In a broad sense, the total cost of livestock production accounts for around 65 to 70 percent of rearing expenditure.

Costs and returns of milk production of per milch buffalo per day

Per day returns from milk production on the basis of buffalo are given in Table 1. The gross return on the basis of milk per animal higher recorded in the medium category (Rs. 235.00) followed by small (Rs. 217.98) and marginal (Rs. 189.50). Therefore, net return per animal per day was maximum recoded in medium category owners followed by small and marginal as Rs. 208.91, 191.92 and 163.83, respectively with overall mean as Rs. Rs. 220.72. The Cost of milk production/litre recorded as Rs. 7.08, Rs. 8.07 and Rs. 8.71 in marginal, small and medium groups with average Rs. 7.94/litre.

Production and maintenance cost of per milch buffaloes per annum (in Rs.)

The different attributes considered in the production and maintenance costs are given in Table 2. It was observed that total production and maintenance cost in buffalo per annum was highest as Rs. 73,594.35 and lowest Rs. 66,555.61 in case of medium category and marginal category households, respectively with overall average cost (Rs. 70,183.16). It was further observed that the total fixed cost was also found highest medium (Rs. 3264.09) followed by small (Rs. 3027.54) and marginal (Rs. 2838.06) category households with overall average as Rs. 3043.23.

The fodder cost of milch buffalo per annum was highest for medium followed by small and marginal as Rs. 30,624.03, 28,889.00 and 28,318.01, respectively with overall average as Rs. 29,277.01. The concentrates cost was also found highest for medium (Rs. 23,261.47) than small (Rs. 22,433.50) and marginal (Rs. 20,609.41) with an overall average (Rs. 22,101.46). Whereas, the labour charges were lowest recorded in marginal households (Rs. 10,958.76) as compared to small households (Rs. 11,983.94) and medium households (Rs. 12,023.41) with overall average (Rs. 11,655.37). The veterinary charges were found highest in medium households (Rs. 1928.78) than small households (Rs. 1617.69) and marginal households (Rs. 1730.02) and the other miscellaneous expenditure was also found in medium (Rs. 2492.58) as compared to marginal (Rs. 2335.53) and small (Rs. 2213.68). The total average cost of fodder, concentrates, the total cost of feed, labour charges, veterinary charges, miscellaneous expenditure and fixed cost on overall basis were as 41.72, 31.49, 73.21, 16.61, 2.51, 3.34 and 4.34 percent, respectively per annum.

Per litre costs of milk production

The cost of production of milk is directly related to the net return of the product. An analysis of the costs of milk production is an indicator of the profitability of the dairy unit.

The per liter costs of milk production per lactation are presented in Table 2. The results showed that the total cost (total fixed cost and total variable cost) and milk production per buffalo per lactation was Rs. 66,555.61 and 2287.50 liter, Rs. 70,399.52 and 2271.80 liter and Rs. 73,594.35 and Rs. 2387.00 liter for marginal, small and medium households, respectively with an overall was Rs. 70,183.16 and 2315.43 liter. The net return after sold of milk and buffalo dung maximum recorded in marginal category, medium and small as Rs. 32236.89, 29397.15 and 27753.58, respectively. The per liter cost of milk production on marginal, small, and medium size groups was estimated to be Rs. 29.10, Rs. 30.99 and, Rs. 30.83 with overall mean as Rs. 30.311. The benefit-cost ratio (B:C ratio) was highest recorded in marginal category owner (1.48) as compared to medium (1.40) and small (1.39) because marginal livestock owners utilized all items and attributes with proper attention.

Conclusion

The study showed that buffalo rearing farming is much better in terms of the production cost per animal, the maintenance cost per animal, milk cost per lactation, milk yield per lactation and input-output ratio in Western Uttar Pradesh. From the present study, it can be concluded that buffalo rearing is a more profitable and economical venture for the marginal livelihood community as well as small and medium categories of buffalo owners.

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Table 1. Production and maintenance cost of per buffalo per day (in Rs/lit.).

S.N.	Particulars	Size group of farms			
		Marginal	Small	Medium	Average
A.	Variable cost				
	Cost of feed and concentrates				
1.	Green fodder	5.23	5.04	5.05	5.10
2.	Dry fodder	5.70	5.66	5.81	5.72
3.	Concentrate	7.95	8.30	8.25	8.17
4.	Total feed cost [Cost 1+2+3]	18.87	19.00	19.10	18.99
	Cost of labour				
5.	Family labour	3.65	2.48	1.12	2.42
6.	Hired labour	0.57	1.96	3.14	1.89
7.	Total human labour[Cost 5+6]	4.23	4.44	4.26	4.31
8.	Veterinary cost	0.62	0.64	0.68	0.65
9.	Miscellaneous expend.	0.85	0.86	0.88	0.87
10.	Total variable cost[Cost 4+7+8+9]	24.58	24.94	24.93	24.82
B.	Fixed cost				
11.	Depreciation	0.46	0.48	0.50	0.48
12.	Interest on fixed assets	0.63	0.64	0.65	0.64
13.	Total fixed cost [Cost 11+12]	1.09	1.12	1.16	1.12
14.	Total cost of production [Cost 10+13]	25.67	26.06	26.09	25.94
C	Cost of return				
15.	Avg. milk yield/day	5.20	6.00	6.50	5.90
16.	Return after sold of milk @ Rs. 35/kg.)	182.00	210.48	227.50	206.66
17.	Sale of dung @ Rs. 0.50/kg (Avg. dung production 15 kg/animal/day)	7.50	7.50	7.50	7.50
18.	Gross return (Rs.) [16+17]	189.50	217.98	235.00	214.16
19.	Net return [Cost 18 -14]	163.83	191.92	208.91	188.22
20.	Cost of milk production/lit. (Rs.) [14/15]	7.08	8.07	8.71	7.94

Table 2: Cost and Return of Milk Production of Buffalo in Meerut district of Uttar Pradesh (Rs/ buffalo/annum).

S.N.	Particular	Size group of farms			
		Marginal	Small	Medium	Average Rs. (%)
A.	Variable cost				
	Cost of feed and concentrate				
1.	Green fodder	13,552.36 (20.36%)	13,609.32 (19.33%)	14,232.65 (19.34%)	13,798.11 (19.66 %)
2.	Dry fodder	14,765.65 (22.19%)	15,279.68 (21.70%)	16,391.38 (22.27%)	15,478.90 (22.06 %)
3.	Concentrate	20,609.41 (30.97%)	22,433.50 (31.87%)	23,261.47 (31.61%)	22,101.46 (31.49 %)
4.	Total cost of feed [Cost 1+2+3]	48,927.42 (73.51%)	51,322.50 (72.90%)	53,885.50 (73.22%)	51,378.47 (73.21 %)
	Cost of labour				
5.	Family labour	9472.24 (14.23%)	6691.38 (9.50%)	3166.16 (4.30%)	6443.26 (9.18 %)
6.	Hired labour	1486.52 (2.23%)	5292.56 (7.52%)	8857.25 (12.04%)	5212.11 (7.43 %)
7.	Total human labour cost [Cost 5+6]	10,958.76 (16.47 %)	11,983.94 (17.02 %)	12,023.41 (16.34 %)	11,655.37 (16.61 %)
8.	Veterinary cost	1617.69 (2.43%)	1730.02 (2.46%)	1928.78 (2.62%)	1758.83 (2.51 %)
9.	Miscall. Expenditure cost	2213.68 (3.33%)	2335.53 (3.32%)	2492.58 (3.39%)	2347.26 (3.34 %)
10.	Total variable cost[Cost 4+7+8+9]	63,717.56 (95.74%)	67,371.99 (95.70 %)	70,330.27 (95.56 %)	67,139.94 (95.66 %)

B.	Fixed cost				
11.	Depreciation	1191.98 (1.79%)	1297.52 (1.84%)	1424.33 (1.94%)	1304.61 (1.86 %)
12.	Interest on fixed assets	1646.07 (2.47%)	1730.02 (2.46%)	1839.76 (2.50%)	1738.62 (2.48 %)
13.	Total fixed cost[Cost 11+12]	2838.06 (4.26 %)	3027.54 (4.30 %)	3264.09 (4.44 %)	3043.23 (4.34 %)
14.	Total cost [Cost 10+13]	66,555.61 (100.00 %)	70,399.52 (100.00 %)	73,594.35 (100.00 %)	70,183.16 (100.00 %)
C.	Cost of return				
15.	Avg. milk yield/lactation (litre)	2287.50	2271.80	2387.00	2315.43
16.	Return after sold of milk @ Rs. 42 /kg.)	96,055.00	95,415.60	1,00,254.00	97,248.06
17.	Sale of dung @ Rs. 0.50/kg (Avg. dung production 15 kg/animal/day for 365 days)	2737.50	2737.50	2737.50	2737.50
18.	Gross return (Rs.) [16+17]	98,792.50	98,153.10	1,02,991.50	99,985.56
19.	Net return [Cost 18 -14]	32,236.89	27,753.58	29,397.15	29,802.40
20.	Cost of milk production/lit. (Rs.) [14/15]	29.10	30.99	30.83	30.31
21.	B:C Ratio [18/14]	1.48	1.39	1.40	1.42

Note: Figure in parentheses shows the percentage to the sample farms.

