



An Economic Analysis of Milk Production of Buffalo and Cow in Rajasthan

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ABSTRACT

The present study was conducted in Rajasthan during the year 2017-18. An attempt has been made in this investigation to work out the cost and returns from milk production across different milch species of animals. The study covered 60 dairy households from Jaipur and Alwar districts. The results of the study revealed that the average size of herd (standard animal units) of households surveyed was 6.68 and majority of them were buffalo followed by young stock, crossbred cow and local cow. Average investment per household was ₹ 2,69,455 per annum and the major expenditure was on milch animals (₹ 1,98,842) followed by cattle shed and stores (₹ 59,475) and dairy equipments (₹ 11,138). Average milk yield per day per animal was highest for crossbred cow (7.22 litres) followed by buffalo (5.49 litres) and local cow (3.98 litres). Net maintenance cost per milch animal per day was found to be relatively higher in case of crossbred cow (₹ 151.51) followed by buffalo (₹ 148.91) and local cow (₹ 119.68). The per litre cost of milk production was observed to be higher in case of local cow (₹ 30.07) followed by buffalo (₹ 27.12,) and crossbred cow (₹ 21.04). The net income per day was relatively higher in case of buffalo (₹ 73.44) as compared to crossbred cow (₹ 23.18), while it was found negative for local cow (-4.86).

Key words: Buffalo, Cow, Investment pattern, Maintenance cost, Net income, Rajasthan

INTRODUCTION

Livestock farming in Rajasthan state is closely interwoven with agriculture and plays an important role in determining the rural economy by providing gainful employment to small and marginal farmers, agriculture laborers, farm women and other deprived groups. Rajasthan is the second largest milk producing state (with share of 12.61 per cent to total milk production of India) in the country where per capita per day availability of milk was 785 grams (NDDB, 2016-2017). Rajasthan is the only state in India where the local breeds of animal are abundantly available. The buffaloes and cows are the primary sources of milk.

Few outstanding research work on the economics of milk production has been conducted earlier by the different researchers such as Bairwa (2004), Singh (2005), Meena *et al.* (2010), Chand and Sirohi (2012) in Rajasthan while Singh *et al.* (1994) and Shiyani and Singh (1995), Kalra *et al.* (1995), Singh and Agrawal (2007), Bardhan and Sharma (2012), Sunil *et al.* (2016) and Chand *et al.* (2017) studied economics of milk production at different part of the country. But economics of milk production differs from region to

region and district to district, animal to animal and year to year.

Production cost, at given level of prices, 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 daily 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 cost of milk production. In view of the overwhelming importance of the milk production in devising the rural economy of Rajasthan, the present investigation was carried out and an attempt has been made to work out the cost and returns from milk production.

MATERIALS AND METHODS

The study pertains to the state of Rajasthan. The Jaipur and Alwar districts were selected purposively from Rajasthan on the basis of highest livestock

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population. These two districts contribute approximately 11 per cent of total livestock population of the state. These two districts shared about 24.17 per cent of the registered Dairy Cooperative Societies in the year 2016-17. From each selected district, two tehsils were selected randomly. From each tehsil, one village was selected randomly. Thus, Amar and Mozamabad tehsils from Jaipur district and Kishangarhbas and Mandawar tehsils from Alwar district were selected randomly. The village Sirsali and Mokhampura from Jaipur district and Ghasoliand Mator from Alwar district were selected randomly. Total four tehsils and four villages of two selected districts were taken in sample. The final sampling unit was dairy household. From each selected village, 15 dairy households having at least one lactating animal were selected randomly. Thus, a total of 60 dairy households were randomly selected for the present study. The study was based on primary data which were collected with the help of well-structured pre-tested schedule by personal interview method. This study was conducted during the year 2017-18.

Certain expenses were incurred by the farmers for the entire herd on the farm. Fixed assets like cattle shed; other fixed equipments and miscellaneous items are jointly used for animals of all age groups of either sex. Hence, the total expenses of a household on the joint cost items; depreciation and interest on fixed assets (other than value of milch animal that is animal specific), human labour, miscellaneous cost were apportioned on the basis of standard animal units (SAUs) as suggested by Kumbhare *et al.* (1983). The depreciation on milch local cows, crossbred cows and buffaloes were calculated by straight line method and rates of deprecation were considered as 12, 8 and 10 per cent, respectively, assuming a productive life of 8 years for local cows, 12 years for crossbred cows and 10 years for buffaloes. The depreciation for other fixed assets was taken based on the appropriate assumptions regarding their useful economic life.

The overall maintenance cost of milk production is an aggregate of expenditure incurred on the fixed and variable items. Net cost was obtained by subtracting the imputed value of dung from the gross cost. The net

cost of maintenance per milch animal per day was divided by the respective average milk yield per milch animal per day to arrive at per litre cost of milk production. Various cost concepts and income measures were employed given as under.

Returns from milk production: The gross returns considered to take into account two items *i.e.* milk and dung. The sale of calves and/or adult animals was not taking into account in calculation of return. The following cost concepts and income measures were computed.

Cost A = Expenditure on feeds and fodders
(+) Veterinary expenditure (+)
Expenses on hired human labour (+)
Miscellaneous expenditure (+) De
preciation on fixed assets

Cost B= Cost A (+) Interest on fixed capital

Cost C= Cost B (+) Imputed value of family
labour

Gross Income = (Quantity of milk * Prevailing price
of milk + Quantity of dung * Price
of dung)

Farm business income = Gross Income - Cost A

Family labour income = Gross Income - Cost B

Net income = Gross Income - Cost C

RESULTS AND DISCUSSION

The herd strength and the number of milch animals in the household directly affect the economy of the milk producers. Different breeds, species and types of animals were maintained in various households. The herd size maintained by households was converted into standard animal units using the conversion factors suggested by Kumbhare *et al.* (1983) and same is presented in Table 1. On an average, a milk producer household maintained a herd size of 6.68 standard animal units which consisting of 3.68, 0.72, 0.37 and 1.91 standard animal units of buffalo, crossbred cow, local cow and young stock in study area. There was no draught animal due to the adoption of farm mechanization. It is clear that milk producer households were having more buffalo as compared to crossbred cow and local cow in livestock resource.

Table 1: Average size of herd (Standard Animal Units)

Buffalo	Milch animals		Young stocks	Total
	Cross bred cow	Local cow		
3.68 (55.08)	0.72 (10.78)	0.37 (5.54)	1.91 (28.59)	6.68 (100.00)

Figures in parentheses indicate the percentages of the total Standard Animal Units.

The investment on different items like cattle shed and stores, dairy equipments and dairy animals was worked out and presented in Table 2. A close perusal of the table revealed that total investment per household in dairy enterprise was ₹ 2,69,455. Nearly 74 per cent of the total investment was incurred on milch animals followed by 22 per cent on cattle shed and stores and the balance 4 per cent on dairy equipments. A similar finding of investment pattern was also observed by Meena (2008) in Alwar district of Rajasthan. Since investment pattern depends upon the number of animals of different types maintained in a household, a comparison of investment made for milch animals is possible only in terms of standard animal units. Investment per standard animal unit in dairy enterprise was ₹ 40,337.57.

The ultimate objective of any dairy development programme is to attain increased income level of the milk producers through higher average milk yield of milch animals. It is evident from the table that the average milk yield per day per animal was highest for crossbred cows (7.22 litres) followed by buffaloes (5.49 litres) and local cows (3.98 litres). The state average milk yield was 7.78 litres for crossbred cows, 4.75 litres for buffaloes and 3.44 for local cows (Government of Rajasthan, Directorate of Animal Husbandry, Jaipur). The productivity of buffaloes and local cows in study area was higher as compared to state average milk yield, while it was lower in case of crossbred cows.

In order to understand milk production from its economic perspective, it is essential to study the costs, be it implicit or explicit that goes into its production. The analysis of cost of milk production across the milch species forms an important aspect in bovine husbandry. The comparative analysis of overall average daily maintenance cost for buffaloes and cows is presented in Table 4. A perusal of the data revealed that the

overall average per day net maintenance cost per milch animal was found to be ₹ 148.91 for buffalo, ₹ 151.51 for crossbred cow and ₹ 119.68 for local cow. The results of study revealed that net maintenance cost was higher in crossbred cows followed by buffaloes and local cows. These results are in line with the findings observed by Sirohi *et al.* (2007), Lal and Chandel, (2016), Sonawane (2016), Sunil *et al.* (2016) and Chand *et al.* (2017) while Bairwa (2004) found higher maintenance cost in buffaloes followed by crossbred cows and local cows. The component wise analysis of maintenance cost indicated that fixed and variable costs accounted for 17.53 and 82.47 per cent in case of buffaloes, 20.05 and 79.95 per cent in case of crossbred cows, and 18.09 and 81.91 per cent in case of local cows, respectively of gross cost. Sharma and Singh (1994) and Kalra *et al.* (1995) also observed the share of variable and fixed cost to be approximately 85 and 15 per cent of gross cost respectively. The component wise break-up of variable cost component indicated that the feed cost accounted for 56.73 per cent of gross cost for buffaloes, 52.80 per cent for crossbred cows and 55.01 per cent for local cow. Singh *et al.* (1994) and Shiyani and Singh (1995) also observed that feed cost accounted for 55 to 70 per cent of the gross cost in the case of buffaloes. The share of labour cost in gross cost was found to be almost similar at 24.10 per cent for

Table 2: Investment Pattern in dairying

Items	Rupees per annum
1. Cattle shed and stores	59,475 (22.08)
2. Dairy equipments	11,138 (4.13)
3. Milch animals	1,98,842 (73.79)
Investment per household	2,69,455 (100.00)
Investment per Standard Animal Unit	40,337.57

Figures in parentheses indicate the percentages of the total investment per household.

Table 3. Average milk yield of milch animals

Animals	Litres/animal/day
Buffalo	5.49
Crossbred cow	7.22
Local cow	3.98

buffaloes, 25.18 per cent for crossbred cows and 25.36 per cent for local cows. Thus, it can be concluded from the study, by keeping maintenance cost in view, that rearing of crossbred cows was costly as compared to buffaloes and local cows.

Cost of milk production per unit is an important indicator of efficiency of milk production. A major issue in fixation of milk prices is whether, the milk price should be fixed on the basis of total cost of milk production, which entails the value of family labour computed at the on-going wage rates for permanent farm labour or only for the paid out costs, which naturally excludes a major chunk of unpaid costs. Under these circumstances, an attempt has been made in this study to compute maintenance cost of milk production inclusive and

exclusive of family labour and fixed cost. A comparative analysis of maintenance cost, per litre cost of milk production and various income measures for buffaloes and cows have been presented in Table 5.

A perusal of the data revealed that the overall average Cost-A, Cost-B and Cost-C per milch animal per day for buffalo milk production were observed to ₹ 112.41, ₹ 131.93 and ₹ 173.82 while corresponding costs were ₹ 105.52, ₹ 127.13 and ₹ 169.91 for crossbred cow and ₹ 86.18, ₹ 101.40 and ₹ 135.85 for local cow. The overall average net income per day was ₹ 73.44, ₹ 23.18, and ₹ (-) 4.86 for buffaloes, crossbred cows and local cows, respectively. Daily net income was positive for buffalo and crossbred cow while it was negative for local cow. Similar finding of negative returns in case of local cattle was also reported in earlier studies by several authors (Singh and Agrawal, 2007; Bardhan and Sharma, 2012; Singh *et al.* 2012; Chand and Sirohi, 2012).

On an average, the per litre cost of milk production for buffaloes, crossbred cows and local cows

Table 4: Average net maintenance cost of buffaloes, crossbred and local cows

Items of cost	(₹/milch animal/day)					
	Buffalo	Share to gross cost (%)	Crossbred cow	Share to gross cost (%)	Local cow	Share to gross cost (%)
Fixed Cost :						
Depreciation on fixed assets	10.95	6.30	12.45	7.33	9.35	6.88
Interest on fixed assets	19.52	11.23	21.61	12.72	15.22	11.20
(A) Total Fixed Cost	30.47	17.53	34.06	20.05	24.57	18.09
Variable Cost :						
Green fodder	23.38	13.45	21.80	12.83	18.86	13.88
Dry fodder	47.69	27.44	43.62	25.67	38.23	28.14
Concentrate	27.54	15.84	24.30	14.30	17.64	12.98
Total feed cost	98.61	56.73	89.72	52.80	74.73	55.01
Family labour	41.89	24.10	42.78	25.18	34.45	25.36
Veterinary and miscellaneous expenditure	2.85	1.64	3.35	1.97	2.10	1.55
(B) Total Variable Cost	143.35	82.47	135.85	79.95	111.28	81.91
Gross Cost (A+B)	173.82	100.00	169.91	100.00	135.85	100.00
(C) Value of dung	24.92	-	18.41	-	16.17	-
Net Cost (A+B-C)	148.91	-	151.51	-	119.68	-

Table 5: Cost of milk production and income measures for milch animals

(₹ /milch animal/day)

A. Cost Concepts	Buffalo	Crossbred cow	Local cow
1. Expenditure on feed and fodders	98.61	89.72	74.73
2. Veterinary and miscellaneous expenditure	2.85	3.35	2.10
3. Imputed value of family labour	41.89	42.78	34.45
4. Depreciation on fixed assets	10.95	12.45	9.35
5. Interest on fixed investment	19.52	21.61	15.22
6. Cost-A = 1+2+4	112.41	105.52	86.18
7. Cost-B = Cost-A+ interest on fixed investment	131.93	127.13	101.40
8. Cost-C = Cost-B+imputed value of family labour	173.82	169.91	135.85
B. Income Measures			
9. Gross income (milk + dung)	247.26	211.54	130.99
10. Farm business income = 9-6	134.85	106.02	44.81
11. Family labour income = 9-7	115.33	84.41	29.59
12. Net income = 9-8	73.44	41.63	-4.86
C. Per litre cost of milk production	27.12	21.04	30.07

was ₹ 27.12, ₹ 21.04 and ₹ 30.07, respectively. Thus, it can be concluded from this study that the per litre cost of milk production was higher in case of local cows followed by buffaloes and crossbred cows. This finding is in line with the observation of Kalra *et al.* (1995). Thus, the results clearly indicate that by keeping net income in view, that buffalo keeping was more profitable than crossbred cow and local cow.

CONCLUSIONS

It may be concluded from the study that the total variable cost of milk production of milch animals varied from 17.53 per cent in buffaloes to 20.05 per cent in crossbred cows. Per animal per day feeding cost ranged from 52.80 per cent in crossbred cow to 56.73 per cent in buffalo of the total cost for dairy animals. The feed and fodders accounted for a major part of the total cost followed by human labour. The per litre cost of local cow milk was high as compared to buffalo and crossbred cows due to lower milk yield of local cows. The cost of milk production and income measures obtained in the present study revealed that buffalo milk production was relatively more profitable than crossbred cow in the study area while rearing of local cow was not profitable in study area. Thus, sound

economic logic exists for persuading dairy households to continue buffalo as well as crossbred cow rearing to enhance their income from milk production and there is need for improvement in the local non-descript / indigenous cows to increase milk productivity. The local cows are more adaptive to climate change. Therefore, instead of ignoring local cow they may be upgraded to recognized indigenous breed and further genetic improvement is required for economic traits.

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