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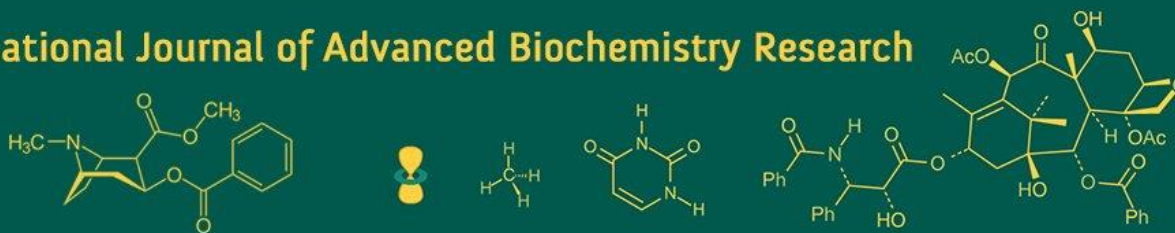
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Analysis of milk production in milch animal of Southern Rajasthan

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Abstract
The present study was conducted in Rajasthan during the year 2018-19. An attempt has been made in this investigation to work out the cost and returns from milk production across different milch species of animal *viz.*, local cow, crossbreed cow and buffalo. The study covered 160 dairy households from Bhilwara and Chittorgarh districts. The results of the study revealed that the small herd size category (standard animal units) contributes 66.25 percent of total households followed by medium (20.63 percent) and large (13.12 percent) categories in the study area. The overall cost of milk production was found lowest for crossbred (₹ 21.66/lit.), followed by buffalo (₹ 27.80/lit.) and local cow (₹ 30.99/lit). Feed cost was higher for buffalo (55.29%) followed by local cow (54.59%) and crossbreed cow (52.01%). However, the expense was higher in case of crossbreed cow (24.37%) followed by local cow (24.26%) and buffalo (23.82%) and decreased with the increase in size of herd. The overall of cost of milk production was lowest for crossbred cow (21.66/lit.), followed by indigenous cow (30.99/lit.) and buffalo (27.80/lit.).

Keywords: Milk production, milch animal, buffalo

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 percent 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) [1], Singh (2005), Meena *et al.* (2010) [9], Chand and Sirohi (2012) [3] in Rajasthan while Singh *et al.* (1994) [13] and Shiyani and Singh (1995) [12], Kalra *et al.* (1995) [5], Singh and Agrawal (2007) [15], Bardhan and Sharma (2012) [2], Sunil *et al.* (2016) [19] and Chand *et al.* (2017) [4] 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 the 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.

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Materials and Methods

The study pertains to the state of Rajasthan. The Bhilwara and Chittorgarh districts were selected purposively from Rajasthan on the basis of highest milk production in southern Rajasthan. From each selected district, four tehsils were selected randomly. From each tehsil, one village was selected randomly. Thus, Aashind, Jahajpur, Bijoliya and Mandal tehsils from Bhilwara district and Gangrar, Rashmi, Kapasan, Chittorgarh tehsils from Chittorgarh district were selected randomly. The village Govindpura, Bheempura, Ummedpura and Mandal from Bhilwara district and Kharkhanda, Rood, Kashmor and Singhpur from Chittorgarh 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, 20 dairy households having at least one lactating animal were selected randomly. Thus, a total of 160 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 2018-19. 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) [6]. 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 percent, 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 (+) Depreciation 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. 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.

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 (7.19 litres) followed by buffaloes (5.44 litres) and local cows (4.06 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 milch animals is presented in Table 2. A perusal of the data revealed that the overall average per day net maintenance cost per milch animal was found to be ₹ 151.09 for buffalo, ₹ 155.68 for crossbred cow and ₹ 125.90 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) [17], Lal and Chandel, (2016) [7], Sonawane (2016) [18], Sunil et al. (2016) [19], Chand et al. (2017) [4] and Meena et al. (2019) [10] while Bairwa (2004) [1] 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 17.43 and 82.57 percent in case of buffaloes, 19.89 and 80.11 percent in case of crossbred cows, and 18.01 and 81.99 percent in case of local cows, respectively of gross cost. Sharma and Singh (1994) [11] and Kalra et al. (1995) [5] also observed the share of variable and fixed cost to be approximately 85 and 15 percent of gross cost respectively. The component wise break-up of variable cost component indicated that the feed cost accounted for 55.49 percent of gross cost for buffaloes, 52.01 percent for crossbred cows and 54.59 percent for local cow. Singh et al. (1994) [13] and Shiyani and Singh (1995) [12] also observed that feed cost accounted for 55 to 70 percent of the gross cost in the case of buffaloes. The share of labour cost in gross cost was found to be almost similar at 23.82 percent for buffaloes, 24.37 percent for crossbred cows and 24.26 percent 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 1&2. 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 ₹ 114.36, ₹ 134.10 and ₹ 176.02 while corresponding costs were ₹ 91.28, ₹ 113.17 and ₹ 174.43 for crossbred cow and ₹ 91.78, ₹ 126.24 and ₹ 135.85 for local cow. On an average, the per litre cost of milk production for buffaloes, crossbred cows and local cows was ₹ 27.80, ₹ 21.66 and ₹ 30.99, 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) [5]. Thus, the results clearly indicate that by keeping net income in view, that buffalo keeping was more profitable than crossbred cow and local cow.

Table 1: Average cost of milk production for districts. (₹ /Lit.)

Category/ Season	Overall
Local Cow	
Small	32.09
Medium	30.60
Large	30.30
Overall	30.99
Crossbreed Cow	
Small	22.16
Medium	21.45
Large	21.37
Overall	21.66
Buffalo	
Small	29.02
Medium	27.64
Large	26.74
Overall	27.80

Table 2: Average net maintenance cost for milch animals across herd size categories (₹/ milch animal/day)

S. No.	Components/ Categories	Local Cow	Cross Breed	Buffalo
		Overall	Overall	Overall
1	Total fixed cost	25.58 (18.01)	34.70 (19.89)	30.68 (17.43)
I	Deprecation on fixed assets	9.78 (6.89)	12.81 (7.34)	10.95 (6.22)
Ii	Interest on fixed assets	15.79 (11.12)	21.89 (12.55)	19.74 (11.21)
2	Total variable cost	116.46 (81.99)	139.73 (80.11)	145.34 (82.57)
I	Feed cost	77.53 (54.59)	90.72 (52.01)	97.68 (55.49)
Ii	Labour cost* (Family labour)	34.46 (24.26)	42.51 (24.37)	41.92 (23.82)
Iii	Vet. & Misc. Exp	4.47 (3.14)	6.50 (3.72)	5.73 (3.26)
3	Gross cost (1+2)	142.03 (100)	174.43 (100)	176.02 (100)
4	Imputed value of dung	16.13	18.75	24.94
5	Net cost (3-4)	125.90	155.68	151.09
6	Average milk yield (lit)	4.06	7.19	5.44
7	Net cost of milk production/lit (5/6)	30.99	21.66	27.80

Conclusions
It may be concluded from the study that the total fixed cost of milk production of milch animals varied from 17.43 percent in buffaloes to 19.89 percent in crossbred cows. Per animal per day feeding cost ranged from 52.01 percent in crossbred cow to 55.49 percent 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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