



Performance of commercial dairy farming in Meerut district of Uttar Pradesh

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ABSTRACT

India's commercial dairy farming sector is a pivotal component of the nation's agrarian landscape, contributing significantly to the economy and the livelihoods of millions of farmers. Analyzing its profitability and identifying production constraints are essential for guiding effective policy interventions. The present study aimed to determine the costs, returns and constraints involved in milk production in the Meerut district of Uttar Pradesh during the period 2020–2024. Primary data were collected from five commercial dairy farms including a total of 182 Sahiwal and 367 crossbred cattle breeds. The study also estimated the overall net maintenance cost per animal per day. The average landholding size among the dairy rearers was 3.0 hectares. The expenditure pattern revealed that the highest cost share was on green fodder (27.70%), followed by dry fodder (22.62%), concentrate feed (21.67%), labour (12.82%), depreciation on milch animals (3.68%), depreciation on livestock sheds (2.43%), mineral mixture (1.27%), veterinary expenses (1.01%), loan interest on milch animals (2.16%), loan interest on sheds/buildings (1.66%), loan interest on equipment (1.16%), and lastly depreciation on equipment (1.59%). The cost of milk production in crossbred cows was Rs. 42.13 per litre per day, and with the sales price Rs. 47.26 per litre, resulted in a net profit of Rs. 5.14 per litre per day. For indigenous lactating cows, the cost of production was Rs. 36.63 per litre and with an average sales price of Rs. 49.14 per litre, yielded a comparatively higher profit of Rs. 12.51 per litre per day; however, this profit may be due to the better sales price because of proximity to the urban area. The net returns were positive across both animal breed categories. The majority of dairy farmers preferred crossbred cows due to higher productivity but indigenous cows can also be profitable if reared in the periphery of an urban area with good sales prices.

Keywords: Commercial Dairy, Economic feasibility, Sustainable dairying, Economic dairy farming, Profitable farming

India boasts a large and diverse livestock population. According to the 20th Livestock Census (2019), the total livestock population stood at 535.78 million, marking a 4.6 percent increase compared to the previous census in 2012. The total bovine population including cattle, buffaloes, mithun, and yaks has reached 302.79 million. Historically, dairy farming was primarily a small-scale, household-level activity (Kumar *et al.* 2010). However, following the Green Revolution and policy initiatives such as Operation Flood in the 1970s, commercial dairy farming experienced rapid growth and evolution, with major advancements in milk production and safety, including the adoption of modern practices such as pasteurisation in the early 1900s. This landmark program transformed India into the world's largest milk producer, with the pivotal role of regional cooperatives in the sector's expansion. Today, dairy farming has moved beyond traditional methods to become a cornerstone of

India's agricultural economy. Dairy farming is more than just a source of milk and dairy products—it is the backbone of rural livelihoods in India. Contributing approximately 4.6 percent to the national GDP, the dairy sector engages millions of farmers, especially women, who often take primary responsibility for milking and production-related activities. It provides a stable and reliable source of income for rural families and plays a crucial role in ensuring nutritional security through the widespread availability of milk and milk-based products.

Total global milk production (from cows, buffaloes, sheep, and goats) has been estimated to be around 940–950 million metric tonnes (MMT) in 2022–23, according to FAO/OECD, and is growing at a rate of 1–2 percent annually. The International Farm Comparison Network (IFCN, 2000) reported global cow milk production at 539.65 million tonnes in 2020, with a projected rise to approximately 558.48 million tonnes by 2025. India is by far the largest milk producer, followed by the European Union, the United States, and China. India's cow and buffalo milk production was around 93.8 MMT in 2020, which was expected to increase to 103.2 MMT by 2025. The EU-27 region produced approximately 145 MMT in 2024, consistent with its 2020 levels. The United States

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produced between 102–103 MMT milk annually, while China, largely reliant on cow's milk, and produced only around 43 MMT milk in 2024, with modest growth. Most milk produced globally is consumed domestically. India's total milk consumption (cow and buffalo) was approximately 216 MMT in 2024. Fluid milk consumption alone was forecasted to reach around 91 MMT by 2025. In contrast to this, the EU's fluid milk consumption was only 23.6 MMT in 2024, as most of its milk is processed into cheese and milk powder. The U.S. fluid milk usage was estimated at around 102 MMT in 2025. The per capita milk consumption is highest in Europe, America, and parts of Central Asia (above 50 kg per year), whereas India, despite being the largest overall consumer, has a lower per capita intake of just over 60 kg amounting to roughly 400 kg in total for its population of 1.4 billion. Increasing per capita consumption in developing regions remains a key driver of future demand growth (MacDonald *et al.* 2007).

The Indian dairy market is currently booming, with an estimated market size exceeding \$140 billion and an annual growth rate ranging between 15–20 percent. This remarkable expansion is driven by factors such as rapid urbanization, rising disposable incomes, evolving dietary preferences, and increasing demand for value-added dairy products. Considering the above facts, this study was undertaken with the objective to evaluate the comparative economics of indigenous and crossbred cattle production under commercial dairy farm conditions and to find out the constraints of dairy farming that existed in and around the Meerut district of Uttar Pradesh, India, during the period 2020–2024.

MATERIALS AND METHODS

Location of study: The data for the present investigation were collected from the five commercial dairy farm maintained under the field conditions. The latitude and longitude of the study area, India, were approximately 28.9845° N, 77.7064° E (decimal) or 28° 59' 24" N, 77° 42' 13" E (degrees, minutes, seconds), respectively. In the respective places, the highest recorded temperature was approximately 46.1°C (115.0°F), typically occurring during the peak of summer in June. Daily maximums during the hottest month of May or June averaged around 38 to 41°C while the lowest recorded temperature was approximately -0.4°C (31.3°F), which was observed in January. Daily minimums during the coldest month of January average around 7°C to 10°C with the overall mean yearly temperature around 24.1°C (75.3°F), and average annual rainfall between 788.9 mm to 886 mm.

Experimental animals: The indigenous (Sahiwal) and crossbred cattle included a total of 182 Sahiwal and 367 crossbred animals from different commercial dairy farms.

Management of animals: Most of the dairy farms use a semi-intensive housing pattern. They feed sugarcane tops, wheat straw, jowar and berseem, oats, etc., along with concentrate like cottonseed cake, choker, grain, etc., and frequent watering of animals

Parameters studied/ recorded: The data on the following tentative parameters was collected from the available records of various commercial dairy farms and through personal interviews : number of commercial dairy farmers, number of herds/ animals, age of animals, name of breed/ species, average daily milk yield (kg), peak milk yield, length of lactation, total lactation milk yield (kg.), parity, dry period, age of first calving, service period, service per conception, calving interval, season of calving, herd life etc. The major viable/sources of input (feed and fodder, medicines etc.) and output (milk sales, by-products etc.) were analysed to assess the profitability of the dairy herd.

Cost of milk production: The costs and returns of milk production are important indicators of the evaluation of the profitability of a dairy farm. The total costs involved in milk production comprise fixed costs and variable costs. For the estimation of different costs and returns, the following methodology was followed.

Fixed costs: Fixed costs (FC) are the expenditure incurred by the producer irrespective of the level of production. Various components of fixed costs include depreciation and interest on fixed capital. The capital recovery cost (CRC) method was used for the estimation of fixed cost.

Depreciation cost: Depreciation is defined as a reduction in the value of fixed assets due to wear and tear over time, accidental damage and technological obsolescence. Annual depreciation on animals, buildings, machinery and equipment used in dairy farming were considered for CRC calculation using the formula given by:

$$R = Z \left[\frac{(1+r)^n r}{(1+r)^n - 1} \right]$$

Where R is the capital recovery cost, Z is the initial value of the capital asset, r is the interest rate, and n is the useful life of the asset.

When the assets were purchased from borrowed capital, the actual interest rate charged by the bank was taken as 'r', while in the case of owned funds, the rate of interest on a term deposit of 1-5 years was taken. The total CRC was then apportioned into individual animals in accordance with Standard Animal Units (SAUs).

Variable Costs: Variable costs are those costs incurred on the variable factors of production. These include feed and fodder cost, labour cost, veterinary and miscellaneous expenses. Data on variable expenses were collected from the farmers and annual expenditures were converted to daily expenses. Subsequently, it has been apportioned into standard animal units (SAUs) for standardization, followed by comparison.

Feed and fodder cost: It included costs of green fodder, dry fodder, concentrates and mineral mixture fed to animals. The cost was estimated as a product of the quantity of certain feed/fodder fed to animals and the purchase price of the respective feed. In case of home-grown feed/fodder, their farm harvest prices were considered. Where

farm harvest prices were not available, the imputed value of crop was taken into account as the prevailing price of the standing crop in the locality. For calculating the cost of the concentrate feed which was prepared at home, weighted prices of ingredients, i.e. share of each component in the concentrate composition, were taken into account.

Labour cost: The information regarding labour requirements for various farm operations and labour cost was collected during the personal interview from the dairy farmers. Labour cost comprised both family labour and hired labour. The cost of hired labour was calculated considering type of work allotted and wages paid, whereas family labour costs were arrived at on the basis of the existing wage rate of permanent farm labour.

Veterinary and miscellaneous expenses: Veterinary expenses included medicines, doctors' fees, vaccination charges as well as natural and artificial insemination charges. Miscellaneous expenditure included electricity, water charges, expenses on repairing fixed assets, and other related expenses.

Standard Animal Units (SAUs): Fixed assets, like cattle sheds, feed manger, chaff cutter, milk cans and buckets, etc. are used collectively by the farmer for all the cattle irrespective of their age and sex. Therefore, for assigning the joint expenditures on a per animal basis, considering the difference in the regional endowments, age of the animals and animal species as these have different effects on cost structure, the entire herd was converted into SAUs following Sirohi *et al.* (2015) for the northern region. The standard animal unit for the study area is given in Table 1.

Gross Cost: It is the total cost incurred by the producer, which was estimated by adding all the cost components, including fixed and variable costs.

$$\text{Gross Cost} = \text{Total Fixed Cost} + \text{Total Variable Cost}$$

Net Cost: The net cost was estimated by deducting the imputed income earned through dung from the gross cost.

$$\text{Net Cost} = \text{Gross Cost} - \text{Value of the Dung}$$

Cost of milk production: To estimate the cost per litre of milk, the net cost per animal per day was divided by the average milk yield of the animal per day.

$$\text{Cost per litre of milk } (\text{₹/lit}) = \frac{\text{Net cost per animal}}{\text{Avg. milk yield of animal}}$$

Gross Returns: Gross returns were obtained by multiplying the milk yield of an individual animal by the respective prevailing prices in the study area.

Gross Returns:

Net Returns: Net return was computed by subtracting net cost from gross returns.

$$\text{Net Returns} = \text{Gross Returns} - \text{Net Cost}$$

Price of Milk: The price of milk differs for different types of milk, i.e. buffalo, crossbred cow and local cow milk. The weighted average price of milk was calculated for each household by using the following formula.

$$\text{Weighted Average Price} = \frac{\sum P_i W_i}{\sum W_i}$$

Where P_i is the price per litre of the i th type of milk; W_i is the total quantity of i th type of milk sold by the household

Break-even output: Break-even output (BEO) of milk production indicates the quantity of milk a farmer needs to sell to reach at the break-even point i.e. point of no profit and no loss. BEO of milk was calculated using the following formula:

$$\text{BEO} = F / (P - V)$$

where F is the total fixed cost for the product, P is the price per unit of the product, and V is the average variable cost of the product (Venkatesh *et al.* 2012).

The collected data was also subjected to analysis of variance using SPSS 20.0 version to study the effect of various factors. The effect of herd, season, period, age of calving and lactation length on various production and reproduction traits was studied using the least squares analysis of variance for non-orthogonal data using the technique described by Harvey (1966).

RESULTS AND DISCUSSION

Under commercial dairy farming conditions, the analysis of costs and returns from milk production of milch animals is considered a crucial aspect of a dairy enterprise, as it reflects the productivity and profitability of the business.

Socioeconomic profile of dairy farmers: The age of commercial dairy farmers in the Meerut district ranged between 43 and 60 years with agriculture farming as their primary occupation, followed by engagement in dairy as a subsidiary business. The average landholding size among these dairy farmers was 3.0 hectares. The average herd size per farm consisted of 8.0 indigenous cattle and 24.86 crossbred cattle. Similar findings were earlier reported by Kumar *et al.* (2020) and Das *et al.* (2023).

Investment pattern in dairy herds: The investment in dairy herds ranged from approximately ₹8.74 lakh to ₹26.10 lakh per livestock herd. In contrast to this, the total capital investment on farm ranged from about ₹4.86 lakhs to ₹36.51 lakhs (Fig. 1). The highest total standard

Table 1. Standard Animal Units (SAU) for the Northern region

Animals	Indigenous cattle	Crossbred cow
Adult male (>3yrs)	1.08	1.23
Adult female (>3yrs)	1.00	1.27
Young-stock male(<1yrs)	0.39	0.41
Young-stock female (<1yrs)	0.39	0.41
Young-stock male(>1yrs)	0.54	0.61
Young-stock female (>1yrs)	0.46	0.52
Heifer	0.73	0.78

Source: Sirohi *et al.* (2015)

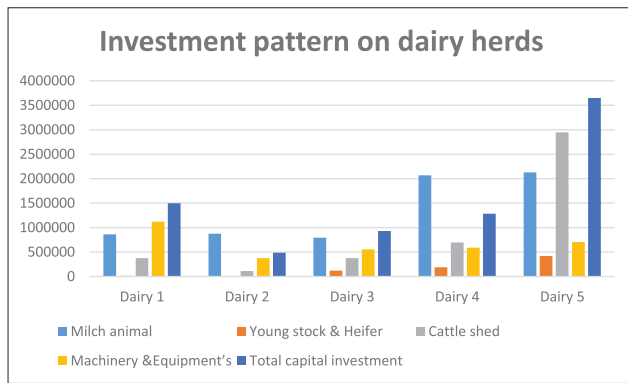


Fig. 1 Investment pattern on dairy herds

animal units (SAUs) were recorded at Dairy Farm No. 5 with 63.50 units, followed by 43.18, 40.00, 10.16, and 7.62 units at Farm Nos. 4, 1, 3, and 2, respectively. The investment per standard animal unit (TSAU) ranged from ₹10,464.06 to ₹2,39,604.30 per herd. Similar studies had also been conducted by Sorathiya *et al.* (2020), Venkatesh *et al.* (2012), Varathan *et al.* (2012), and Vanishree *et al.* (2018).

Expenditure pattern and cost-return analysis of dairy herds in Meerut district: The average overall expenditure pattern of dairy herds in Meerut district showed that the highest share (27.70%) was spent on green fodder, followed by dry fodder (22.62%), concentrate feed (21.67%), and labour expenses (12.27%). Other costs included depreciation on milch animals (3.68%), depreciation on sheds (2.43%), mineral mixture (1.27%), veterinary expenses (1.01%), insurance costs (0.0%), miscellaneous expenses (0.72%), interest on milch animals (2.16%), interest on sheds/buildings (1.66%), interest on equipment (1.16%), and depreciation on equipment (1.59%), as detailed in Table 2. Similar expenditure trends were reported in earlier studies by Ghule *et al.* (2012), Acharya and Malhotra (2020), and Mohapatra *et al.* (2021).

The cost and return analysis of lactating indigenous cows in Meerut revealed an overall cost of production of ₹36.63 per liter per day, while the average sale price was ₹49.14 per liter per day, resulting in a profit of ₹12.51 per

liter per day at Farm No. 1 (Fig. 2; Table 3). In contrast, for lactating crossbred cows, the cost of production was ₹42.13 per liter per day, with a sale price of ₹47.26 per liter, yielding a profit of ₹5.14 per liter per day on the crossbred dairy farms in the district.

Breed-wise productive and reproductive performance of dairy herd: Table 4 comprises the performances of indigenous and crossbred cattle within the Meerut district. It revealed that the crossbred cow had lower parity orders compared to indigenous cows but, the average milk yield was significantly higher in crossbred (11.71±0.36 kg) cows compared to indigenous (8.20±0.39 kg) cows. The average age at first calving was 24.15±0.15 and 41.73±0.96 months in crossbred and indigenous cows, respectively. When the data was subjected to statistical analysis, it was found that milk yield and parity order had significant differences among both indigenous and crossbred cows in Meerut district. However, a similar range of findings were also reported by Kumar *et al.* (2017), Kumar *et al.* (2020), and Das *et al.* (2023).

For a commercial dairy business in India, breed selection by business model for large-scale commercial dairy preferred a high-grade Holstein -friesian dominant crossbreds with some number of buffaloes for higher percentage of milk fat at a dairy farm. For a medium-scale commercial dairy (moderate inputs, mix of concentrate and green fodder) preferred the good-grade crossbreds (HF × Sahiwal/Karan Fries). For low-input or pasture/field-based commercial systems, preferred a Sahiwal, Gir, or non-descript cattle. There is some practical recommendations for the dairy business start with a mix: 40–60% crossbreds (HF × Indigenous) for volume, 20–40% Buffaloes for milk solids, 10–20% pure Indian cattle breeds (Sahiwal/Tharparker) for resilience and breeding stock.

The dairy business, like any other enterprise, involves various expenditure components that contribute to its overall cost structure. The expenses in a dairy business can be broadly categorized into several key areas: feed costs, labor costs, veterinary and livestock health costs, utilities and energy costs, repairs and maintenance, land and property expenses, insurance, fees and compliance etc.

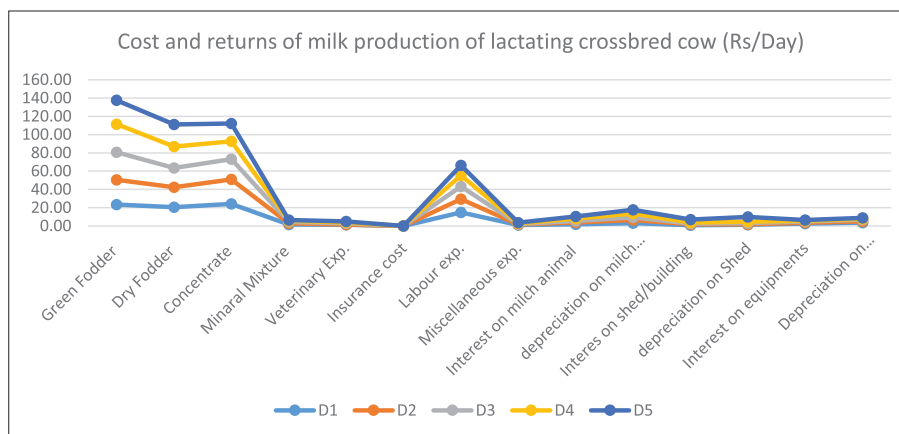


Fig. 2 In X axis of graph, level Rs. Per day and in Y axis, level Dairy Farm No.

Table 2. Expenditure pattern of dairy herd in Meerut district (Rs/Day)

Sl. No.	Particulars	Dairy 1 (Indigenous)	%	Dairy 2 (Crossbred)	%	Dairy 3 (Crossbred)	%	Dairy 4 (Crossbred)	%	Dairy 5 (Crossbred)	%	Average	%
1	Green Fodder	1466.25	23.45	1702.00	27.11	1987.20	30.11	3496.00	30.77	3272.90	26.05	2384.87	27.70
2	Dry Fodder	1292.60	20.67	1357.00	21.62	1397.25	21.17	2672.60	23.52	3018.75	24.03	1947.64	22.62
3	Concentrate	1508.80	24.13	1681.30	26.79	1472.00	22.30	2208.00	19.43	2461.00	19.59	1866.22	21.67
4	Minerals Mixture	97.75	1.56	74.75	1.19	103.50	1.57	155.25	1.37	115.00	0.92	109.25	1.27
5	Veterinary Exp.	82.80	1.32	17.25	0.27	85.10	1.29	105.80	0.93	144.90	1.15	87.17	1.01
6	Insurance cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	Labour exp.	920.00	14.71	920.00	14.66	920.00	13.94	1380.00	12.14	1380.00	10.99	1104.00	12.82
8	Miscellaneous exp.	63.25	1.01	37.95	0.60	28.75	0.44	83.95	0.74	97.75	0.78	62.33	0.72
9	Interest on milch animal	118.45	1.89	121.90	1.94	114.76	1.74	277.64	2.44	298.56	2.38	186.26	2.16
10	Depreciation on milch animal	201.25	3.22	207.00	3.30	195.34	2.96	472.59	4.16	508.30	4.05	316.90	3.68
11	Interest on shed/building	55.52	0.89	51.15	0.81	59.23	0.90	105.50	0.93	444.25	3.54	143.13	1.66
12	Depreciation on Shed	85.07	1.36	25.20	0.40	91.89	1.39	161.62	1.42	680.55	5.42	208.86	2.43
13	Interest on equipment's	170.20	2.72	55.67	0.89	84.40	1.28	89.22	0.79	99.39	0.79	99.78	1.16
14	Depreciation on equipment's	232.99	3.73	75.87	1.21	115.31	1.75	121.92	1.07	137.68	1.10	136.75	1.59
15	Total expenditure	6294.93	-	6327.04	-	6654.72	-	11455.45	-	12659.03	-	8678.23	-
16	Value of dung	41.40	-	50.03	-	55.20	-	92.00	-	96.60	-	67.05	-
17	Net cost (15-16)	6253.53	100.0	6277.01	100.0	6599.52	100.0	11363.45	100.0	12562.43	100.0	8611.19	100.0
18	Per animal expenditure	352.71	-	324.39	-	340.36	-	287.32	-	300.39	-	321.03	-
19	Standard Animal Unit (SAU)	40.00	-	7.62	-	10.16	-	43.18	-	63.50	-	24.89	-

Table 3. Cost and returns of milk production of lactating cow in Meerut district (Rs/Day)

Sl.No.	Particulars	Dairy 1 (Indigenous)	%	Dairy 2 (Crossbred)	%	Dairy 3 (Crossbred)	%	Dairy 4 (Crossbred)	%	Dairy 5 (Crossbred)	%	Average	%
1	Green Fodder	841.35	23.44	227.19	27.13	529.70	30.12	1142.09	30.77	1011.27	26.06	750.32	27.33
2	Dry Fodder	741.71	20.66	181.13	21.63	372.45	21.18	873.10	23.52	932.74	24.03	620.22	22.41
3	Concentrate	865.76	24.12	224.42	26.80	392.37	22.31	721.32	19.43	760.40	19.59	592.86	21.51
4	Minerals Mixture	56.09	1.56	9.98	1.19	27.59	1.57	50.72	1.37	35.53	0.92	35.98	1.31
5	Veterinary Exp.	47.51	1.32	2.30	0.27	22.68	1.29	34.56	0.93	44.77	1.15	30.37	1.10
6	Insurance cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	Labour exp.	527.90	14.71	122.80	14.66	245.23	13.94	450.82	12.15	426.39	10.99	354.63	12.87
8	Miscellaneous exp.	36.29	1.01	5.07	0.60	7.66	0.44	27.43	0.74	30.20	0.78	21.33	0.77
9	Interest on milch animal	67.97	1.89	16.27	1.94	30.59	1.74	90.70	2.44	92.25	2.38	59.56	2.16
10	Depreciation on milch animal	115.48	3.22	27.63	3.30	52.07	2.96	154.39	4.16	157.06	4.05	101.32	3.68
11	Interest on shed/building	31.86	0.89	6.83	0.82	15.79	0.90	34.47	0.93	137.26	3.54	45.24	1.64
12	Depreciation on Shed	48.81	1.36	3.36	0.40	24.49	1.39	52.80	1.42	210.28	5.42	67.95	2.47
13	Interest on equipment's	97.66	2.72	7.43	0.89	22.50	1.28	29.15	0.79	30.71	0.79	37.49	1.36
14	Depreciation on equipment's	133.69	3.72	10.13	1.21	30.74	1.75	39.83	1.07	42.54	1.10	51.39	1.86
15	Total expenditure	3612.08		844.54		1773.86		3742.32		3911.41		2776.84	
16	Value of dung	22.23		7.02		15.21		30.42		30.42		21.06	
17	Net cost (15-16)	3589.85	100.00	837.52	100.00	1758.65	100.00	3711.90	100.00	3880.99	100.00	2755.78	100.00
18	Milk production per day	114.66		22.23		45.63		102.96		106.47		78.39	
19	Per litre cost of production	36.63		44.08		45.09		42.18		42.65		42.13	
20	Sales price per litre	49.14		46.80		46.80		46.80		46.80		47.26	
21	Profit/loss	12.51		2.72		1.71		4.62		4.15		5.14	

Table 4. Comparative performances of Indigenous and crossbred cattle within Meerut district

Meerut		N	Mean
Parity	Indigenous	40	3.08±0.20
	Crossbred	98	2.86±0.12
	Total	138	2.92±0.10
Milk yield	Indigenous	40	8.20±0.39 ^a
	Crossbred	98	11.71±0.36 ^b
	Total	138	10.69±0.31
AFC	Indigenous	40	41.73±0.96 ^b
	Crossbred	98	24.15±0.15 ^a
	Total	138	29.25±0.74

Means with different superscripts ^(a,b) differ significantly at 5% level of significance

The overall average expenditure pattern of the dairy herd in Meerut district was highest (27.70 percent) on green fodder followed by dry fodder (22.62 percent), concentrate (21.67 percent), Labour expenditure (12.82 percent), Depreciation on milch animal (3.68 percent), Depreciation on Shed (2.43 percent), Mineral mixture (1.27 percent), Veterinary exp.(1.01 percent), Insurance cost (0.0 percent), Miscellaneous exp.(0.72 percent), Interest on milch animal (2.16 percent), Interest on shed/building (1.66 percent), Interest on equipment's (1.16 percent) and depreciation on equipment's (1.59 percent), respectively.

The cost and returns of lactating indigenous cows in Meerut revealed that the overall cost of production per litre was Rs 36.63/litre per day and the average sale price per litre was Rs 49.14/litre per day. The profit was found Rs 12.51 per litre per day. On the other hand, lactating crossbred cow farm cost and return was as Rs . 42.13 per litre/day cost of production and Rs 47.26 was the sales price per litre. The overall profit of Rs. 5.14 per litre per day on the crossbred dairy farms.

REFERENCES

- Acharya K K and Malhotra R. 2020. Economic analysis of milk production in peri-urban dairy farms of Odisha. *Indian Journal of Dairy Science* **73**: 155–59.
- Das A K, Mitra A, Kumar R, Singh U, Kumar S, Raja T V, Alex R, Kumar K A, Sirohi A S and Saha S. 2023. Genetic evaluation of Frieswal cattle for first lactation milk yield from smallholder dairy production systems in Kerala State of India. *Indian Journal of Animal Sciences* **93**(2): 176–81.
- Dairy Report (2000) International Farm Comparison Network (IFCN)
- Ghule A K, Verma N K, Cahuhan A K and Pravin Sawale. 2012. An Economic Analysis of Investment Pattern, Cost of Milk Production and Profitability of Commercial Dairy Farms in Maharashtra. *Indian Journal of Dairy Science* **65**(4): 65–72.
- Harvey, W. 1966. Oxford: Clarendon Press.
- <https://www.dahd.gov. of 21st Livestock Census.pdf>.
- Kumar R, Das A K, Raja T V, Rathee SK, Dubey P P and Prakash B. 2017. Performance of crossbred cattle (HF × Sahiwal) under tropical farming conditions of Punjab. *Indian Journal of Animal Sciences* **87**(11):1402–05.
- Kumar R, Prasad N, Kumar A, Raja T V and Das A K. 2020. Cattle production system in the Doab area of Uttar Pradesh. *Indian Journal of Animal Sciences* **90**(1): 90–93.
- Kumar R, Singh R and Rajkumar. 2010. Buffalo Production System in India. *Revista Veterinaria* **2**: 32–37.
- MacDonald J M, O'Donoghue E J, McBride W D, Nehring R F, Sandretto C L and Mosheim R N. 2007. Profits, costs, and the changing structure of dairy farming: a report from the Economic Research Service. United States Department of Agriculture Economic Research Report Number 47. www.ers.usda.gov.
- Mohapatra S, Sendhil R, Singh A, Dixit A K, Malhotra R and Ponnusamy K. 2021. An economic analysis of milk production in Haryana. *Indian Journal of Dairy Science* **74**(2): 159–66.
- Singh P and Datta K K. 2016. Economic analysis of traditional milk supply chain in Ranchi district of Jharkhand. *Indian Journal of Economics and Development* **12**: 495–502.
- Singh S, Tegegneb F and Tegegneb E. 2012. The food processing industry in India: Challenges and opportunities. *Journal of Food Distribution Research* **43**(1): 1–10.
- Sirohi S, Bardhan D and Chand P. 2015. Cost and return in milk production: Developing standardised methodology and estimates for various production systems, Project Report of ICAR- National Dairy Research Institute (Deemed University), Karnal submitted to Department of Animal Husbandry, Dairying and Fishery, Ministry of Agriculture and Farmers Welfare, New Delhi
- Sorathiya L M, Rathva A L and Gadhvi D N. 2020. Feasibility Study of Higher Investment towards Mechanization in Commercial Dairy Farms. *Veterinary Research International* **8**(2): 142–47.
- Vanishree M, Sendhil R, Sirohi S, Chauhan A K, Rashmi H M and Ponnusamy K. 2018. Value chain analysis of input delivery system for liquid milk in Bengaluru milk union of Karnataka. *Indian Journal of Dairy Science* **71**: 502–8.
- Varathan B J, Prabu M, Pandian A S S, Kumar G S and Kumar K N S. 2012. Production and marketing constraints in dairy cattle rearing as perceived by women self-help group members and non-members. *Tamil Nadu Journal of Veterinary and Animal Sciences* **8**(2): 68–71.
- Venkatesh P, Sangeetha V, Sundaramoorthy C, Sendhil R and Thomas L. 2012. A study on economics of milk products in Madurai district of Tamilnadu. *Bioinfolet* **9**: 298.