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# An analysis of the cost of producing milk from indigenous cows in Telangana state

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## Abstract
Dairy farming has a tremendous impact on the social and economic well-being of farmers in Telangana state. An investigation of the price of producing milk was carried out in the Telangana districts of Karimnagar, Khammam, and Rangareddy. In the selected districts, information was acquired from 240 farmers who were spread out across 24 villages and 6 mandals. The 240 respondents were interviewed as per the questionnaire.

In terms of the price of milk production from indigenous cows, the average total fixed price was Rs. 25.09 or 15.86% of the whole price. Each animal received an average of 11.35, 4.96, and 2.35 kg of green feed, dry feed, and concentrate daily. Concentrates, dry fodder, and green feed each had an average price of Rs. 1.43, Rs. 3.87, and Rs. 30.38, respectively. The largest component of overall Variable prices was the cost of feed (67.60%), followed by labour (12.59%) and miscellaneous charges (3.93%). Concentrate (45.14%) had the greatest cost share when compared to green fodder, dry fodder. The cow's total variable price makes up 84.13 percent of the overall cost. There was a Rs. 151.82 average net price. Average daily milk output per animal was 4.09 lit, and the daily milk sale price per kg per animal was Rs. 38.08. It was discovered that the cost of producing milk for large, medium and small herd sizes was Rs. 36.65, Rs. 37.04, and Rs. 38.10, respectively. The cost of producing milk on average per animal per day was shown to be Rs. 37.11. The typical cow net price was Rs. 3.94. The calculated profit per litre of milk was Rs. 0.96. It was discovered that the average Benefit-Cost Ratio was 1.02.

**Keywords:** Indigenous cow, cost of producing milk, cost of feed, variable prices, gross prices, net prices

## 1. Introduction
In India, dairying is intricately woven into agriculture and serves as a vital component in the el evation of rural poor people. Poor input and poor output livestock production techniques are prevalent in India. About 68 percent of cattle are owned by landless, marginal, and small farmers, who also make up a substantial portion of the livestock business. In addition to supplying families with dairy animals with nutrients, the dairy industry regularly provides potential job prospects and financial gains. For more than 80–90 million milk producers in the nation, the dairy industry is a significant source of secondary income. Cattle and buffalo production systems are still largely based on traditional and are giving way to the organized and commercial production systems wherein quality and profitability are given due importance. In spite of traditional based dairy farming, the dairy industry has risen significantly over time with an annual growth rate of over 4 percent.

Since 1998, India has been the top milk-producing country in the world, and it also has the largest bovine population. In India, milk production climbed from 17 million tons in 1950–51 to 198.4 million tons in 2019–20, a 5.70 percent increase over the 187.7 million tons produced in 2018–19.

Telangana, the nation's youngest state, is ranked 8th in terms of the number of livestock, with 34.18 lakh milch animals, comprising exotic, crossbreed, and indigenous cows and buffaloes, up from 28.97 lakhs in 2014–15. Telangana State is now producing 5.61 MT more milk than it did in 2014–15, placing it in 13th place overall. Private dairies buy the vast majority of the milk produced in the state. The Telangana State Dairy Development Cooperative Federation Limited (TSDDCFL)'s four cooperative dairies only provide 7 lakh liters of milk daily, compared to the state's daily milk sales of 22 lakh liters.

The profitability of dairy enterprise is determined by milk sale price and of late there is lot of uproar from farming community on lack of proper support price for milk.

Having adequate data on cost of milk production in different sized farms in cows and buffaloes will enable policy makers to arrive at a minimum support price for milk, so that the farmer will not be put to loss.

## 2. Materials and Methods
### 2.1. The Cost of Producing Milk
An estimate was made taking inputs and outputs into account. The information was elicited through interaction and by posing the questions present in the interview schedule which was framed for the purpose. For this, the farmer's information that was provided was taken into consideration.

The cost of inputs was calculated by taking into account both the fixed and variable expenses. The entire expenses associated with running a dairy farm included depreciation on various items such the shed, animals, and equipment as well as interest on fixed capital, imputed values for family labour, the price of milk upon sale, and the value of manure, among other things. The approach utilized to estimate and calculate various expenses was as follows.

**2.1.1 Fixed price**: It was seen as the cost that was expended regardless of whether the production was carried. Depreciation value and interest on fixed capital were included.

**2.1.1.1 Interest on fixed capital:** Based on the market rate, interest on fixed capital was calculated. This amount was taken into consideration by calculating the total interest to be paid divided by 365 to arrive at the interest per day.

**2.1.1.2 Depreciation on fixed capital:** Depreciation was defined as the decrease in an asset's value brought on by usage, wear and tear, accidents, and passing of time. It was calculated with consideration for the current value and life time for dairy animals (10%), animal sheds (2.5%), and machinery or equipment (2.5%). This sum was calculated by dividing the annual depreciation total by 365 to get the daily depreciation rate.

**2.1.2 Variable price:** The expenses associated with the variable elements of production that changed from day to day were referred to as variable prices. Feed price, labour price, and other prices were included. According to the information provided by the farmer and my own personal observations on the day of the visit, I tallied the variable prices for dry fodder, green fodder, concentrate feed, and labour for each individual milch cow. Based on the farmer's estimates of daily and yearly spending on these things, the daily expenditure on miscellaneous items per milch animal was calculated.

**2.1.2.1 Feed and fodder price:** Based on the farmer's input about the intake of individual animals, data on the quantity of dry feed, green feed, and concentrate supplied to dairy cows was collected. Although the estimate provided by the farmer was taken as an input, to ensure accuracy of data, personal observation was also made on total quantity of feed and fodder offered on the day of visit. The rates per kg of green, dry fodder and concentrates were arrived at as per the information given by the farmer and also by cross-checking with the local market through animal husbandry official.

**2.1.2.2 Labour price:** Paid labour (hired labour) and family labour were included in the price of labour. Family labour

expenses were computed using the current market rate for agricultural labour, whereas the cost of hired labour was calculated taking into account the type of job assigned and compensation paid. The amount of labour performed in man hours per day was translated to money by multiplying it by the matching wage rate.

**2.1.2.3 Miscellaneous charges:** Other prices included the price of breeding for AI or the bull's service fee, as well as the price of vaccinations and medications. They were determined based on the number and type of milch animals kept by the home every day. The farmer's report of the prices expended was taken into account. The sum was determined on an animal-by-animal basis.

### 2.1.3 Other cost concepts used
**2.1.3.1 Gross price:** This figure was arrived at by summing all price elements, both fixed and variable.

i.e., Gross price = Total Variable price + Total Fixed price

**2.1.3.2 Income from dung:** For value of dung, rough estimate of dung voided by animal per day was taken as 30 kg fresh and calculated per year and finally divided by 365 to arrive at the per day value after removal of 60% of moisture. The total income from dung of all the milch animals was taken to arrive at the average value.

**2.1.3.3 Net price:** The imputed income from the sale of dung was subtracted from the Gross price to get the Net price.
i.e., Net price = Gross price – Income from dung (Kumawat *et al.*2016) [9].

**2.1.3.4 Gross profit:** It was calculated by multiplying the milk production of a single dairy animal by the relevant current sale prices in the research region.

i.e., Gross profits = Amount of milk $\times$ Milk sale price

**2.1.3.5 Net income:** Net income was calculated by subtracting Net price from Gross profits,

i.e., Net Income= Gross profits – Net price

**2.1.3.6 Milk sale price:** The Milk sale price was taken as per the information given by the farmer.

### 2.1.4 Cost of producing milk
The average Net price per animal per day was divided by the average milk output of animals per day in order to assess the cost of producing milk.

Net price =X1 + X2+ X3+ X4+ X5 – VD

Cost of producing per day per kg (C) =<u>TNMC</u>

TM

Where,
X1= Cost of green fodder per day per animal
X2= Cost of dry fodder per day per animal
X3= Cost of concentrates per day per animal
X4= Labour price per day
X5= Miscellaneous charges per day per animal

VD= Income from dung (Arrived figure per day per animal)
TNMC = Total Net Maintenance price or Net price
TM= Average quantity of milk produced per day per animal in litre

**2.1.5 Benefit- cost ratio:** In order to look from the angle of input and output the following formulae was used to calculate the Benefit-cost ratio.

$1 = R / C$

Where,
R= Milk sale price sold per litre
C= Cost of producing milk per litre

**3.Results**
The experiment's findings were collated, statistically analyzed, and then interpreted.

**3.1. Fixed and Variable prices of producing milk pertaining to different production systems of indigenous cow (Rs. per animal/day**
Fixed and Variable prices of producing milk pertaining to different production systems of indigenous cow (Rs. per animal/day) are presented in Table. 1. The average depreciation cost and interest on fixed capital were Rs. 12.09 (7.64%) and Rs. 13.00 (8.22%), respectively, according to the data. The typical daily feeding amount of green, dry, and concentrate for each animal was 11.35, 4.96 and 2.35 kg respectively and average cost of green, dry fodder and concentrates in the studied areas were Rs. 1.43, Rs. 3.87 and Rs. 30.3 respectively. Regarding the expenses, it was discovered that the total Fixed price, average Total feed price, and total Variable price per animal per day were, respectively, Rs. 25.09, Rs. 106.91, and Rs. 133.06.

The analysis found that feed cost was the major cost components in total Variable price accounting 67.60 percent followed by Labour price (12.59%) and Miscellaneous charges (3.93%). Among the feed costs concentrates was the major cost component constituting of about 45.14 percent on an average followed by dry fodder and green fodder accounting 12.15 and 10.30 percentages respectively. The Fixed prices and Variable prices constitute of 15.86 and 84.13 percent respectively.

Economics of cow milk production (per animal/day) are presented in Table. 2. The average gross and Net prices were determined to be Rs. 158.15 and 151.82 respectively, according to the Table. The average amount of milk produced each day per animal and the cost of selling a litre of milk were 4.09 lit and Rs. 38.08, respectively. The research area's average net income was shown to be Rs. 3.94. The average cost of producing milk per animal per day was determined to be Rs. 37.11, while the average profit per liter of milk produced was found to be Rs. 0.96. The average cost-benefit ratio was determined to be 1.02.

**Table 1:** Fixed and Variable prices of producing milk pertaining to different production systems of indigenous cow (Rs. per animal/day)

| Cost of components | | Large | Medium | Small | Average |
|---|---|---|---|---|---|
| **Fixed prices** | | | | | |
| Depreciation cost (Rs) | | 14.66 | 12.21 | 9.47 | 12.09 |
| | | (8.13) | (7.71) | (6.88) | (7.64) |
| Interest on fixed capital (Rs) | | 15.36 | 13.35 | 11.30 | 13.00 |
| | | (8.52) | (8.43) | (8.21) | (8.22) |
| Total Fixed price (Rs) | | 30.02 | 25.56 | 20.71 | 25.09 |
| | | (16.65) | (16.14) | (15.05) | (15.86) |
| **Variable price** | | | | | |
| Feed price/ animal | Quantity of green fodder offered (kg) | 12.47 | 11.29 | 10.31 | 11.35 |
| | Rate /kg (Rs) | 1.49 | 1.47 | 1.35 | 1.43 |
| | Total cost (Rs) F1 | 18.58 | 16.59 | 13.91 | 16.30 |
| | | (10.30) | (10.48) | (10.10) | (10.30) |
| | Quantity of dry fodder offered (kg) | 5.14 | 5.03 | 4.73 | 4.96 |
| | Rate /kg (Rs) | 3.97 | 3.89 | 3.77 | 3.87 |
| | Total cost (Rs) F2 | 20.40 | 19.56 | 17.83 | 19.22 |
| | | (11.31) | (12.35) | (12.95) | (12.15) |
| | Quantity of Conc. Offered (kg) | 2.58 | 2.35 | 2.92 | 2.35 |
| | Rate /kg (Rs) | 30.92 | 30.23 | 29.99 | 30.38 |
| | Total cost (Rs) F3 | 79.77 | 71.04 | 63.58 | 71.39 |
| | | (44.25) | (44.88) | (46.22) | (45.14) |
| Total feed price (F1+F2+F3) | | 118.75 | 107.19 | 95.32 | 106.91 |
| | | (65.87) | (67.72) | (69.27) | (67.60) |
| Labour price (Rs) | | 25.10 | 19.29 | 15.38 | 19.92 |
| | | (13.92) | (12.18) | (11.17) | (12.54) |
| Miscellaneous charges (Rs) | | 6.39 | 6.23 | 6.18 | 6.23 |
| | | (3.54) | (3.93) | (4.49) | (3.93) |
| Total Variable price (Rs) | | 150.24 | 132.71 | 116.88 | 133.06 |
| | | (83.34) | (83.84) | (84.94) | (84.13) |
| Gross price (Rs) | | 180.26 | 158.27 | 137.59 | 158.15 |

**Table 2:** Economics of producing milk pertaining to different production systems of indigenous cow (Rs. per animal/day)

| Sl. No | Particulars | Large | Medium | Small | Average |
|---|---|---|---|---|---|
| 1. | Gross price (Rs) | 180.26 | 158.27 | 137.59 | **158.15** |
| 2. | Income from dung/day (Rs) | 8.00 | 6.00 | 5.00 | **6.33** |
| 3. | Net price/day/animal (Rs) | 172.26 | 152.27 | 132.59 | **151.82** |
| 4. | Average milk yield (lit/day) | 4.70 | 4.11 | 3.48 | **4.09** |
| 5. | Milk sale price/lit (Rs) | 37.88 | 37.84 | 38.53 | **38.08** |
| 6. | Gross profits/day (Rs) | 178.06 | 155.54 | 134.08 | **155.76** |
| 7. | Net income/animal (Rs) | 5.80 | 3.27 | 1.49 | **3.94** |
| 8. | Cost of producing milk/lit (Rs) | 36.65 | 37.04 | 38.10 | **37.11** |
| 9. | Profit per lit milk produced (Rs) | 1.23 | 0.79 | 0.42 | **0.96** |
| 10. | Benefit-cost ratio | 1.03 | 1.02 | 1.01 | **1.02** |

## 4. Discussion

### 4.1. Variable and Fixed prices of producing milk in indigenous cow

Table 1's perusal revealed that the entire Fixed price was 15.86% of the overall cost. When farms of various herd sizes were compared, it was shown that large farms (16.65%) had the greatest total Fixed prices, followed by medium (16.14%) and small farms (15.65%). This may be because large farms invest more money in infrastructure development, such as building barns and buying livestock and equipment.

Total feed prices made up the largest portion of total Variable prices (67.60%), followed by Labour prices (12.59%) and Miscellaneous charges s (3.93%). Large farms (65.87%), followed by medium farms (67.72%) and small farms (69.27%), had the lowest Total feed price. These findings were similar to findings of (Singh, 2006; Thakur, 2010; Khoveio, 2012; Sandeep, 2012; Manjunatha, 2014; Singh and Datta, 2016; Vishwas, 2016 and Kalyani, 2018) [17, 21, 7, 14, 10, 18, 19, 22, 6]. Total feed price constitutes major portion in Variable price which is mainly due to the high cost of concentrates.

Due to their higher market price, concentrate (45.14%) had the biggest percentage of expenses among green fodder, dry fodder, and concentrate. This is similar with the earlier studies carried out by (Thakur, 2010; Khoveio, 2012; Sharma, 2013; Singh and Datta, 2016; Vishwas, 2016; Kalyani, 2018; Acharya and Malhotra, 2020 and Sandeep, 2020) [18, 7, 14, 19, 21, 22, 6]. Costs for green fodder was followed by dry fodder.

Indigenous cow's total Variable prices account for 84.13 percent of the overall cost. Large farms (83.34%) had the lowest total variable expenses, followed by medium farms (83.84%) and small farms (84.94%).

Labour was hired in case of large and medium farms on monthly basis which was converted to per day per animal basis whereas small farms use family labour, and it was worked out at prevailing hired Labour price. Large farms (13.92%) had the greatest labour costs, followed by medium (12.18%) and small farms (11.17%). All herd sizes were determined to have relatively minimal miscellaneous charges.

### 4.2. Economics of producing indigenous cow

Table 2's analysis showed that large farms had the greatest total Net price (Rs. 172.26), followed by medium farms (Rs. 152.27) and small farms (Rs. 132.59). In the research region, the average Net price per animal per day was determined to be Rs. 151.82. This finding was greater than those reported by (Mankar, 2003; Das, 2004; Desai, 2005; Singh, 2008; Sharma, 2013 and Jadav *et al.,* 2016) [11, 20, 3, 4, 6]. Due to higher Fixed price and Variable price, large farms were having higher Net prices. Large farms generated the most money from manure (Rs. 8), followed by medium (Rs. 6) and small (Rs. 5) farms. Dung generated an average salary of Rs.

6.33.

The typical cow Net price was Rs. 3.94. Comparing across different herd size categories, it was found that large farms (Rs. 5.80), followed by medium (Rs. 3.27), and small farms (Rs. 1.49), got the maximum net revenue from cows.

Small farms had the greatest cost per liter of milk produced (Rs. 38.10), followed by medium farms (Rs. 37.04/lit) and large farms (Rs. 36.65/lit). This shows cost of producing milk varied negatively with the herd size. This is due to the economics of scale of dairying. These findings are greater than findings of (Khoveio, 2012; Sandeep, 2012; Sharma,2013 and Kalyani, 2018) [7, 13]. The cost to produce one litre of milk averaged Rs. 37.11/lit. This finding was greater than the findings of (Singh, 2008; Thakur, 2010; Khoveio, 2012; Sandeep, 2012; Sharma, 2013; Manjunath, 2014; Sharif, 2014; Kumawat *et al.*, 2016; Jadav *et al*., 2016; Singh and Datta, 2016; Kalyani, 2018 and Kiran kumar, 2021) [9, 21, 18, 7, 13, 19, 20, 6, 5].

Large farms had the highest profit per liter of milk (Rs. 1.23), followed by medium (Rs. 0.79) and small farms (Rs. 0.42). This finding is lesser than findings of (Singh, 2006; Sandeep, 2012; Manjunatha, 2014; Kalyani, 2018 and Acharya and Malhotra, 2020) [17, 10, 6, 13] and greater than findings of Singh (2008) [20] who reported the profit was in negatives. Considering this the average profit/litre of milk was calculated as Rs. 0.96/lit. This finding was lesser than findings of (Das, 2004) [3] who reported that average profit was Rs. 1 .62, Rs. 1.28 respectively.

It was discovered that the average Benefit-Cost Ratio was 1.02. When comparing various herd sizes, it was shown that large farms had the highest (1.03), followed by medium farms (1.02), and small farms (1.01), indicating that large farms are more lucrative than medium and small farms. This finding was less than the findings of (Vishwas, 2016; Neelam and Khan, 2017; Kalyani, 2018 and Akanksha, 2019) [22, 6].

## 5. Conclusion

It was concluded that the average Gross price was found to be Rs. 158.15 and the average Net price was determined to be Rs. 151.82, respectively. Average milk output per animal per day was 3.94 liters, and the cost to purchase a litre of milk was Rs. 38.08, correspondingly. The daily average cost per animal to produce milk was Rs. 37.11. The cost of producing one liter of milk was found to be highest for small farms (Rs. 38.10), followed by medium farms (Rs. 37.04) and large farms (Rs. 36.65). The average indigenous cow's Net price was Rs. 3.94. Comparing across different herd size categories, it was found that large farms (Rs. 5.80), followed by medium (Rs. 3.27), and small farms (Rs. 1.49) got the highest net revenue from indigenous cows. Large farms made the most money per liter of milk (Rs.1.23), followed by

medium (Rs. 0.79) and small farms (Rs. 0.42). An average profit of Rs. 0.96 per litre of milk produced was discovered. Large farms had the best benefit-cost ratio (1.03), followed by medium farms (1.02), and small farms (1.01). An average benefit-cost ratio of 1.02 was discovered

## 6. Acknowledgements

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