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## Financial feasibility of investment in large scale dairy enterprises in Karnataka

**Revappa M Rebasiddanavar, SS Guledagudda, GN Kulkarni, AS Patil and BG Shivakumar**

### Abstract

The present study attempts to analyze financial feasibility of investment in large scale dairy enterprises in Karnataka. The Indian economy is an agrarian-economy. Agriculture is considered as an important pillar of the Indian economy which support livelihood to large proportion of rural population in the country. The total share of agriculture to the economy is 18.8 percent in 2022-23. The livestock industry is playing an essential role in the socio-economic development of millions of rural households. Livestock keeping an integral component of agriculture in India and make multifaceted contributions to the growth and development of the agricultural sector. The results reveals that overall total cost per dairy unit was ₹ 7,95,620 and ₹ 8,35,410 per year in Belagavi and Bellary districts in North Karnataka respectively while ₹ 8,63,080 and ₹ 8,64,274 for Mysore and Tumkur in South Karnataka respectively. The gross returns from large scale dairy enterprises per year analyzed for Belagavi and Bellary districts of North Karnataka are ₹ 10,49,300 and ₹ 10,30,500 for respectively. While, gross returns realized from large scale dairy enterprise from milk per year analyzed for Mysuru and Tumkur districts of South Karnataka are ₹ 10,28,315 and ₹ 10,35,900 respectively. The overall results revealed that the returns from milk constitutes a major share of gross returns per dairy unit in both North (72.91% and 71.32%, respectively) and South (72.15% and 70.91%, respectively) Karnataka. Returns realized from manure and the sale of animals constituted a considerable share of gross returns per dairy unit in both North (23.28% and 24.84%, respectively) and South (23.48% and 24.43%, respectively) Karnataka. The results of financial feasibility analysis could be observed that Net Present Worth (Rs. 63,237.75), Benefit Cost Ratio (1.23), Internal Rate of Return (42.75%) and Payback Period (4.34years). It can be concluded that an investment in large scale dairy enterprise is a financially feasible and economically viable in both North and South Karnataka.

**Keywords:** Large scale dairy enterprise, milk, dairy

### Introduction

The Indian economy is an agrarian-economy. Agriculture is considered as an important pillar of Indian economy which support to livelihood large chunk of population in the country. The total share of agriculture to the economy is 18.8 percent in 2022-23. The agriculture sector employs the highest number of workers. The share of workers engaged in agriculture has risen marginally to 46.5 percent in 2020-21 from 45.6 percent in 2019-20 (Ministry of Agriculture and Farmers Welfare, 2021) [2]. India is the second-most populous country in the world. Therefore, there is always a constant need for a supply of food to feed such a huge population. The livestock industry is playing an essential role in the socio-economic development of millions of rural households. Livestock keeping an integral component of agriculture in India and make multifaceted contributions to the growth and development of the agricultural sector. Livestock helps in improving food and nutritional security by providing nutrient-rich food products, generate income and employment and act as a cushion against crop failure, provide draught power and manure inputs to the crop subsector, and contributes to foreign exchange earnings through exports. Additionally, livestock make substantial contributions to environmental conservation, supplying draught power and manure for fertilizer and domestic fuel that save the use of petro-products.

Livestock provides livelihood to two-third of rural masses and employs about 8.8 percent population of India. While dairying alone ensures the livelihood of 70 million farm families. Livestock alone contributes 16 percent to the income of small farm households as against 14 percent for all rural households. The economic survey 2022-23 also highlighted another important trend of increasing contribution of the livestock sector.

The livestock sector grew at a compound annual growth rate of 7.9 percent during 2014-15 to 2020-21 (at constant prices). The livestock sector contributes 5.1 percent to Indian Gross Domestic Product (GDP) and 31 percent share of the total agriculture GDP.

### Materials and Methods

In order to analyze the financial feasibility of investment in large scale dairy entrepreneurs in Karnataka, the primary data were collected. The multistage purposive sampling was employed for selection of districts, talukas and dairy farmers. In the first stage, two districts namely Belagavi and Bellary in North Karnataka while, in South Karnataka, Mysuru and Tumkur were purposively selected based on highest milk production. In the second stage, two taluks each from selected districts were chosen based on highest milk production. In the third stage, 20 farmers from each taluk were selected purposively. Sample size of 40 large scale dairy enterprises in each district were chosen. Thus, the overall sample size was 160 for the study. The profitability of the dairy enterprise was worked out using the costs and returns concepts. Simple statistical measures like financial feasibility analysis, averages, percentages and ratios were employed using the primary data.

### Cost concepts

#### Variable cost

Variable costs vary with the level of output. In the context of dairy enterprise, the variable costs comprise of feed and fodder costs, labour costs, veterinary service expenses, miscellaneous expenses and interest on working capital.

- a. **Feed and fodder cost:** It was calculated by multiplying the quantity of feed and fodder fed to animals by their respective prices. The purchased feed and fodder were valued at their purchase price. The own-grown fodder was valued at its prevailing market price in the study area.
- b. **Labour cost:** It includes both cost of hired labour and the imputed cost of family labour. The work of eight hours in daily is considered one man-day. The working hours were converted into man-days and the man-days were multiplied by the prevailing wage rate to arrive at the labour cost.
- c. **Veterinary service cost:** The expenditure incurred on artificial insemination (AI), vaccination of animals and medicines were considered as the components of veterinary service cost of dairy enterprise.
- d. **Miscellaneous cost:** The expenditure incurred on electricity, water and any other expense were considered under this head.
- e. **Interest on working capital:** It was worked out at the rate of 8 percent per annum.

#### Fixed cost

Fixed costs remain the same irrespective of the level of production. In the context of dairy enterprise, fixed costs include the depreciation cost of animals, animal shed, machinery, equipment and interest on fixed capital.

- a. **Depreciation:** Depreciation on animals, animal shed, machinery and equipment were calculated using straight-line method using the following formula.

$$\text{Annual amount of depreciation} = \frac{(\text{Original cost of the asset}) - (\text{Junk value})}{\text{Useful life of the asset}}$$

The useful life of crossbred cattle, indigenous cattle and buffaloes was assumed to be 12 years (8 calvings). The useful life of the asset was assumed to be 35 years for an animal shed, 15 years for a rubber mat, 15 years for a chaff cutter, 25 years for a milking machine and 30 years for utensils.

- b. **Interest on fixed capital:** It was worked out at the rate of 12 percent per annum.

#### Total cost: It is the sum of the total fixed cost and total variable cost

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

**Total cost per animal:** It can be worked out using following formula

$$\text{Total cost per animal} = \frac{\text{Total cost}}{\text{Number of animals}}$$

### Returns concepts

- a. **Income from the sale of milk and milk products:** Gross returns from milk were obtained by multiplying total milk production in the lactation period with the price received per litre of milk. In the study area, milk was sold by the producers to either consumers or DCSs. Gross returns from milk products (curd, ghee and paneer) were obtained by multiplying the quantity of milk products by their respective price.
- b. **Income from the sale of organic manure:** The dairy-based farmers used dung as organic manure for their crops/ plantations. The manure was valued at its prevailing market price in the study area.
- c. **Income from the sale of animals:** It includes the value of calves, heifers and adult animals sold in a year.

**Gross returns:** It is the sum of the returns from the sale of milk and milk products, organic manure and animals.

**Net returns:** Net returns = Gross returns – Total cost

**Net returns per animal:** It is worked out using following formula

$$\text{Net returns per animal} = \frac{\text{Net returns}}{\text{Number of animals}}$$

### Financial feasibility analysis

To evaluate the financial feasibility of investment in dairy enterprise, the project analysis parameters such as Net Present Worth (NPW), Benefit Cost Ratio (BCR), Internal Rate of Return (IRR) and Payback Period (PBP) were used. A discount rate of 12 percent per annum was considered as an opportunity cost for the financial feasibility analysis, which is the rate of interest charged by banks for term loans. Further, 12 years life period was assumed in the case of crossbred cattle, indigenous cattle and buffaloes, as the investment in the dairy enterprise is a long-term investment in which the returns are spread over a long period. The financial feasibility of investment was calculated per animal. The total establishment cost per animal, the total cost per animal and gross returns per animal were calculated and used in the estimation of the financial feasibility techniques. The details of the estimation procedures of financial feasibility techniques are explained here follow.

### Net present worth (NPW)

This measure indicates the difference between the present

value of benefits and the present value of costs. The project is considered to be financially feasible if it implies a net benefit greater than zero. This measures would indicate that the project would yield benefits above all costs including the opportunity cost of capital. The formula used for computing NPW is given below.

$$NPW = \sum_{t=1}^n \frac{(Bt - Ct)}{(1+r)^t}$$

Where,

Bt = Gross benefit in year 't' Ct = Cost in year 't'

t = Number of years r = Discount rate

**Benefit cost ratio (BCR):** It is the ratio between the discounted cash inflows and the discounted cash outflows. The ratio is obtained by dividing the present worth of discounted benefits by the present worth of discounted costs. The BCR must be greater than unity for a financial investment proposal to be financial feasible. The following formula used for computing BCR is given below.

$$BCR = \frac{\sum_{t=1}^n \{Bt/(1+r)^t\}}{\sum_{t=1}^n \{Ct/(1+r)^t\}}$$

Where,

Bt = Benefit in year 't' Ct = Cost in year 't'

t = Number of years

r = Discount rate

**Internal Rate of Return (IRR):** This technique involves finding out that discount rate which equates the discounted benefits with discounted costs making the net present worth of a cash flow equal to zero. The net cash flows are discounted by changing discount rates until a negative NPW is obtained. For computing IRR, the negative NPW and the preceding positive NPW are considered in the interpolation formula. Interpolation is the process of finding the intermediate value lying between the two discount rates. The IRR should be more than the opportunity cost of capital for a project to be financially feasible and economically viable.

$$\text{Lower discount rate} + \frac{\text{NPW at lower rate}}{\text{NPW at lower rate} - \text{NPW at higher rate}} \times \text{higher rate} - \text{lower rate}$$

**Payback Period (PBP):** The payback period is the length of time taken to get back the investment on the project. It is measured in years. The shorter the payback period, the more viable the investment. Conversely, the longer the payback period, the less viable the investment. It was computed using the following formula.

$$PBP = \frac{\text{Initial investment}}{\text{Average annual net returns}}$$

**Results and Discussion**

**Investment in large scale dairy enterprises in the study area**

The overall total cost per dairy unit was ₹ 7,95,620 and ₹

8,35,410 per year in Belagavi and Bellary districts in North Karnataka respectively and while ₹ 8,63,080 and ₹ 8,64,274 for Mysore and Tumkur in South Karnataka respectively. The main aim of dairy enterprise is to maximize milk yield by providing an adequate quantity of dry fodder, green fodder and concentrates to dairy animals. Hence, in the North Karnataka, the feed and fodder cost per dairy unit exhibited for large scale dairy enterprises in Belagavi and Bellary was ₹ 3,14,541 per year, and ₹ 3,26,296 per year respectively. Similarly, in the South Karnataka, the feed and fodder cost in Mysore and Tumkur districts were ₹ 3,36,845 per year, and ₹ 3,38,651 per year. In North Karnataka, the labour cost per dairy unit accounted to ₹ 78,139 and ₹ 81,384 for Belagavi and Bellary districts respectively. Similarly, for South Karnataka it was ₹ 84,120 and ₹ 82,807 for Mysore and Tumkur districts respectively.

Chandamma (2021)<sup>[4]</sup> and Mohapatra *et al.* (2021)<sup>[6]</sup> reported their similar findings on feed and fodder cost and labour cost were the major components of total cost in the dairy enterprise. The overall results revealed that the share of total fixed cost in the total cost per dairy unit was observed to be lowest (9.81%). The share of total variable cost in the total cost per dairy unit was found to be highest (90.19%). Thus, the share of total variable cost in the total cost per dairy unit was higher than the share of total fixed cost in the total cost per dairy unit, in both North and South Karnataka regions.

**Returns from dairy enterprise in the study area**

The gross returns from large scale dairy enterprises per year analyzed for Belagavi and Bellary districts of North Karnataka are ₹ 10,49,300 and ₹ 10,30,500 for respectively. Similarly, gross returns from large scale dairy enterprise milk per year analyzed for Mysuru and Tumkur districts of South Karnataka are ₹ 10,28,315 and ₹ 10,35,900 respectively. Overall results revealed that the returns from milk constitutes the major share of gross returns per dairy unit in both North (72.91% and 71.32%, respectively) and South (72.15% and 70.91%, respectively) Karnataka. Overall, returns from manure and the sale of animals constitutes a considerable share of gross returns per dairy unit in both North (23.28% and 24.84%, respectively) and South (23.48% and 24.43%, respectively) Karnataka. The findings of the present study are on far with the results of the study conducted by Deshetti *et al.* (2016)<sup>[5]</sup> who reported that the returns from milk constitutes the highest share (78.02%) of the overall gross returns per dairy unit while the returns from manure and the sale of animals constituted a considerable share of the overall gross returns per dairy unit, in Vijayapura and Bagalakote districts of North Karnataka. In North Karnataka the net returns realized per large scale dairy enterprises accounts relatively higher (₹ 2,53,680 and ₹ 1,95,090 respectively), for Belagavi and Bellary districts. In South Karnataka the net returns per dairy unit exhibited relatively lower (₹ 1,65,235 and ₹ 1,71,626 respectively) for Mysore and Tumakuru districts. The net returns per animal were ₹ 18,120 and ₹ 15,006 respectively, in Belagavi and Bellary districts. In South Karnataka the net returns per dairy unit were observed to be lowest (₹ 14,466 and ₹ 10,095 respectively), in Mysore and Tumakuru districts. Thus, the net returns per animal were positive in the case of large scale dairy units in both North and South Karnataka indicating that dairy enterprise is found profitable across all the regions. The overall net returns per animal were higher in the Belagavi (₹ 18,120/year) and Bellary (₹ 15,006/year) districts than that of the Mysore (₹

14,466/year) and Tumakuru districts (₹ 10,095/year) indicating that dairy enterprise is relatively more profitable in the North Karnataka. Hence, the null hypothesis was accepted that proposed dairy enterprise is profitable in the study area.

#### Financial feasibility of investment in dairy enterprise

In North Karnataka the NPW of cash flows was positive and highest for large scale dairy enterprises in Belagavi (₹ 81,678) and Bellary (₹ 62,813) districts. Similarly, in South Karnataka, the NPW was ₹ 53,201 and ₹ 55,259 for Mysore and Tumakuru districts respectively. The B:C ratio was greater than unity in North Karnataka for large scale dairy enterprises for Belagavi (1.31) and Bellary (1.23) districts. Similarly, in South Karnataka, the B:C ratio was greater than unity for Mysore (1.19), and Tumakuru (1.23) districts. The overall results revealed that the B:C ratio (1.23) was greater than unity in Karnataka.

In the North Karnataka, the IRR was substantially higher than the prevailing bank rate (12% per annum) for large scale dairy

enterprises in Belagavi (40%) and Bellary (41%) districts. Similarly, the IRR was considerably higher than the prevailing bank rate in Mysore (44%) and Tumakuru (46%) districts of South Karnataka. The overall results revealed that the IRR was substantially higher than that of prevailing bank rate in Karnataka (42.75%). In North Karnataka the longest PBP was observed for large dairy units in Bellary district (4.25 years) followed by Belagavi (4.20 years). However, in South Karnataka, the longest PBP was observed in Tumakuru (4.50 years) followed by Mysore (4.40 years). The shorter the payback period the better would be dairy enterprise.

Thus, the results of financial feasibility techniques showed favourably that investment in dairy enterprise is financially feasible and economically viable in the study area. Hence, the null hypothesis proposed is accepted. Suresh and Mundinamani (2011)<sup>[10]</sup> and Rashtrarakshak *et al.* (2017)<sup>[8]</sup> reported their similar findings that investment in dairy enterprise was a financially feasible proposition.

**Table 1:** Investment in large scale dairy enterprises in the study area (₹ /dairy unit in a year)

Sl. No.	Particulars	North Karnataka		South Karnataka		Overall
		Belagavi n=40	Bellary n=40	Mysore n=40	Tumakuru n=40	
1	Unit/Herd size (No.)	14	13	17	15	15
2	<b>Fixed Cost</b>					
a	Depreciation cost of animals	28,235 (3.54)	26,179 (3.13)	27,154 (3.14)	29,456 (3.40)	27,756 (3.30)
b	Depreciation cost of animal Shed	1,897 (0.23)	2,189 (0.26)	1,954 (0.22)	2,047 (0.23)	2021 (0.24)
c	Depreciation cost of machinery and equipment	1,541 (0.19)	1,533 (0.18)	1,349 (0.15)	1,457 (0.16)	1470 (0.17)
d	Interest on Fixed capital @ 12%	48,052 (6.03)	50,552 (6.05)	53,487 (6.19)	54,543 (6.31)	51,658 (6.15)
	Total Fixed Cost (TFC)	79,725 (10.02)	80,453 (9.64)	83,944 (9.72)	85,503 (9.89)	82,406 (9.81)
	Fixed cost per animal	5,695	6189	4,937	5700	5494
3	<b>Variable Cost</b>					
a	Feed and fodder cost	3,14,541 (39.53)	3,26,296 (39.05)	3,36,845 (39.02)	3,38,651 (39.18)	3,29,083 (39.19)
i	Dry fodder	40,005 (5.02)	40,293 (4.82)	48,158 (5.57)	45,734 (5.29)	45,225 (5.38)
ii	Green fodder	59,893 (7.53)	61,253 (7.43)	59,147 (6.85)	58,143 (6.72)	57,932 (6.89)
iii	Concentrates	2,14,643 (26.97)	2,24,750 (26.90)	2,29,540 (26.59)	2,34,774 (27.16)	2,25,926 (26.90)
B	Labour	78,139 (9.82)	81,384 (9.74)	84,120 (9.74)	82,807 (9.58)	81,612 (9.72)
C	Veterinary services	9,770 (1.22)	10,075 (1.20)	12,705 (1.47)	11,410 (1.32)	10,990 (1.30)
D	Miscellaneous	4,258 (0.53)	4,530 (0.54)	4,200 (0.48)	4,800 (0.55)	4,447 (0.52)
E	Interest on working capital @ 8%	29,200 (3.6)	33,863 (4.05)	34,705 (4.02)	33,600 (3.88)	32,842 (3.91)
	Total Variable Cost (TVC)	7,15,895 (89.97)	7,54,957 (90.36)	7,79,136 (90.27)	7,78,771 (90.10)	7,57,196 (90.19)
4	Total Cost (TC)	7,95,620 (100.00)	8,35,410 (100.00)	8,63,080 (100.00)	8,64,274 (100.00)	8,39,596 (100.00)
5	TVC/animal	32,177	37,963	30,592	26,309	32,556
6	TFC/animal	5,251	5,751	4,274	3,866	4,802
7	TC/animal	37,428	43,714	34,865	30,175	37,358
8	TVC/litre	34.28	37.08	38.61	40.12	37.37
9	TFC/litre	5.65	6.53	5.37	5.96	6.03
10	TC/litre	39.94	43.61	43.98	46.08	43.40

**Note:** \*Figures in parentheses indicate the percentage

**Table 2:** Returns from large scale dairy enterprise in the study area (/dairy unit in a year)

Sl. No.	Particulars	North Karnataka		South Karnataka		Overall n=160
		Belagavi n=40	Bellary n=40	Mysore n=40	Tumakuru n=40	
1	Unit/Herd size (No.)	14	13	17	15	15
2	<b>Returns from dairy products</b>					
	Average quantity of milk (Litres)	17000.00	16333.33	16487.00	16324.44	16536.19
A	Milk	7,65,000 (72.91)	7,35,000 (71.32)	7,41,950 (72.15)	7,34,600 (70.91)	7,43,900 (71.80)
B	Milk products	48,500 (4.70)	39,500 (3.83)	44,865 (4.37)	48,500 (4.69)	45,341.25 (4.38)
B	Manure	75,800 (7.20)	81,000 (7.86)	93,000 (9.04)	87,500 (8.47)	84,325 (5.19)
C	Sale of animals	1,60,000 (16.08)	1,75,000 (16.98)	1,48,500 (14.44)	1,65,300 (15.96)	1,62,200 (15.66)
3	Gross returns/unit	10,49,300 (100)	10,30,500 (100.00)	10,28,315 (100.00)	10,35,900 (100.00)	10,36,003 (100.00)
4	Net returns/unit	2,53,680	1,95,090	1,65,235	1,71,626	1,96,407
5	Gross returns/ animal	74,950	79,269	60,489.11	69,060	70,942
6	Net returns/ animal	18,120	15,006	14,466	10,095	14,421

Note: \*Figures in parentheses indicate the percentage

**Table 3:** Financial feasibility of investment in large scale dairy enterprise in the study area (per unit)

Sl. No.	Particulars	North Karnataka		South Karnataka		Overall
		Belagavi	Bellary	Mysore	Tumakuru	
1	Net Present Worth (₹)	81,678	62,813	53,201	55,259	63,237.75
2	Benefit Cost Ratio	1.31	1.23	1.20	1.19	1.23
3	Internal Rate of Return (%)	40	41	44	46	42.75
4	Payback Period (No. of years)	4.20	4.25	4.40	4.50	4.34

Note: Life period of dairy enterprise was assumed to be 10 years, and Discount rate @ 12 percent per annum

### Conclusion

This study was conducted to analyze the financial feasibility of investment in large scale dairy enterprises in Karnataka. The overall total cost per dairy unit was ₹ 7,95,620 and ₹ 8,35,410 per year in Belagavi and Bellary districts in North Karnataka respectively and ₹ 8,63,080 and ₹ 8,64,274 for Mysore and Tumkur in South Karnataka respectively. The Gross returns from large scale dairy enterprises per year for Belagavi and Bellary districts of North Karnataka are ₹ 10,49,300 and ₹ 10,30,500 respectively. Similarly, gross returns realised from large scale dairy enterprises per year analyzed for Mysuru and Tumkur districts of South Karnataka are ₹ 10,28,315 and ₹ 10,35,900 respectively. The returns from milk constituted the major share of gross returns per dairy unit in both North (72.91% and 71.32%, respectively) and South (72.15% and 70.91%, respectively) Karnataka. Thus, the net returns per animal were positive in the case of large scale dairy units in both North and South Karnataka indicating that dairy enterprise is profitable across all the regions of Karnataka. In North Karnataka the NPW of cash flows was positive for large scale dairy enterprises in Belagavi and Bellary districts were ₹ 81,678 and ₹ 62,813 respectively. Similarly, in South Karnataka, the NPW was ₹ 53,201 and ₹ 55,259 for Mysore and Tumakuru districts respectively. This implies that investment in large scale dairy enterprise is a financially feasible proposition in both North and South Karnataka. In the North Karnataka, the IRR was substantially higher than the prevailing bank rate (12% per annum) for large scale dairy enterprises in Belagavi (40%) and Bellary (41%) districts. Similarly, the IRR was considerably higher than the prevailing bank rate in Mysore (44%) and Tumkur (46%) districts of South Karnataka. The overall results revealed that the IRR was substantially higher than the prevailing bank rate in Karnataka (42.75%). Dairy enterprise is capital-intensive as evidenced by the high overall

total establishment cost per dairy unit in both North and South Karnataka. The institutional credit agencies may extend adequate finance through a simplified procedure to the farmers undertaking dairy enterprise.

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