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Comparative economics of rural and periurban dairy farming in Kalaburagi district of Karnataka

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Abstract
Cost of milk production is an important economic indicator in assessing the farm household efficiency in milk production as well as basis for price fixation. The study was undertaken to analyse the cost and returns of milk production in rural and periurban dairy farms of Kalaburagi district of Karnataka. The per day maintenance cost in periurban dairy farms (₹ 150.64) was highest compared to rural dairy farms (₹ 91.29)for local cows, crossbred cows and buffaloes. Among total maintenance costs of periurban dairy farming, feed and fodder costs accounted major share (73.49%) followed by labour cost (15.53%) and total fixed cost (7.73%). The return per litre of milk was highest (₹ 8.91) for crossbred cows followed by buffalo (₹ 4.82) and local cows (₹ 0.14). The net return from crossbred cow was more than that of buffalo and local cows indicating higher profitability in rearing crossbred cow in the study area.

Keywords: Buffaloes, Crossbred cow, Local cow, Periurban dairy farm, Rural dairy farms

INTRODUCTION

Livestock sector is an important sub-sector of the agriculture in Indian economy. It forms an important livelihood activity of the farmers, supporting agriculture in the form of critical inputs, contributing to the health and nutrition of the household, supplementing incomes, offering employment opportunities and finally being a dependable “bank on hooves” in times of need. It acts as a supplementary and complementary enterprise. India has vast resources of livestock, which play a vital role in improving the socio-economic conditions of the rural masses. India’s livestock sector is one of the largest in the world with a holding of 11 per cent of world livestock population. India ranks first in respect of buffalo population, contributing 56.70 per cent to the world’s buffalo population and second rank in respect of cattle population, contributing 12.50 per cent to the world’s cattle population (Anonymous, 2017).

Milk production is an important activity of Indian agriculture and is playing an important role in the Indian economy. Dairying is the backbone of the marginal farmers and landless labours spread over numerous villages scattered throughout the country. It is primary source of income and employment for rural poor. India ranks first in milk production, accounting for 19.97 per cent of world production (828 million tonnes), achieving an annual output of 165.4 million tonnes during 2016-17 as compared to 137.69 million tons during 2013-14 recording a growth of 6.26 per cent (Anonymous, 2017).

Karnataka state has 9.19 million cattle and 3.30 million buffaloes, which accounts 4.98 per cent and 3.19 per cent of total cattle and buffalo population of the country respectively). Karnataka produced 6.34 million tonnes of milk in 2015-16. The per capita availability of milk in the state is 282 gm. Karnataka has large network of dairy cooperatives and Karnataka Milk Federation (KMF) is the largest cooperative dairy federation in South India, owned and managed by milk producers of Karnataka. KMF has over 2.39 million milk producers in over 15,223 dairy cooperative societies at village level, functioning under 14 District Cooperative Milk Unions in the Karnataka state (Anonymous, 2017).

Among the different milk producing districts of

Karnataka, Kalaburagi is one of the important milk producing district and out of 14 milk unions in the state one KMF milk union is located in Kalaburagi city. Kalaburagi district supplies large quantity of milk to neighboring Telangana and Maharashtra states. It is argued that farmers of villages located around Kalaburagi city are realizing better income from sale of milk compared to rural areas. Hence, it is necessary to study the comparative economics of dairy farming in rural area and outskirts of Kalaburagi city. Therefore, an attempt is made to study the economic performance of periurban and rural dairy farming in Kalaburagi district of Karnataka.

MATERIALS AND METHODS

Study area: The Kalaburagi district was purposively selected for the study, since the dairy farmers are highest among the districts of Hyderabad Karnataka region. Further, the Kalaburagi milk union is leading in milk collection and distribution in the region. Kalaburagi district consists of seven talukas, out of these, three talukas of the district namely Aland, Jewargi and Kalaburagi talukas were selected on the highest quantity of milk production in the district.

Further, two villages from each talukas were chosen based on the highest number of farmers producing milk in the rural area. Similarly, 5 sample farmers from each village in the rural area were chosen for the study. Therefore, a total 30 milk producers from 6 villages of rural area were selected for the study. However, to elicit required information in the periurban area, 30 farmers from 6 villages were chosen considering 10 km buffer zone around the Kalaburagi city corporation limit as periurban region. Total sample size of milk producer constituted 60 farmers from rural and periurban area.

Methodology: To achieve the objectives of the study, the multistage random sampling procedure was adopted for selection of dairy farms in rural and periurban dairy farms of Kalaburagi district of Karnataka. In case of rural dairy farms, a total of 30 milk producers from six villages of rural area were chosen. However, to elicit information in periurban area 30 farmers from six villages were chosen considering 10 Km buffer zone around the Kalaburagi city corporation limit is as periurban region. The data collected from 60 dairy farmers were scrutinized, tabulated and analysed. The data were subjected to tabular analysis for working out the socio-economic profile, cost and returns of milch animals across rural and periurban sampled households.

RESULTS AND DISCUSSION

Socio-economic features dairy farmers: The general characteristics of the sample farmers (Table 1) revealed that majority of the rural dairy farmers (46.66%) are between the age group of 41-50 years followed by above 50 years age group (23.33%), 30-40 years age group (20.00%) and below 30 years age group (10.00%). Similarly, 43.33 per cent of periurban dairy farmers were in the age group of 30-40 years followed by 41-50 years (30.00%), above 50 years (16.66%) and bellow 30 years (10.00%) age group.

It is important to note that, majority of rural dairy farmers were illiterate (26.66%) and 23.33 per cent had completed high school education followed by primary (20.00%) and graduation (6.66%). Similarly, majority of periurban dairy farmers were high school (30.00%) followed by PUC (23.33%) and graduation (10%).

It was found that majority of the sample farmers were having medium (4-6 members) family size followed by large (8.00%) and small (3-7%) family size in both rural and periurban dairy farms. A similar result has also been reported by Rangnath (2008) in Haryana. On an average rural and periurban dairy farmers are having around six family members in the household.

With respect to land holding, majority of the rural dairy farmers were small farmers (36.66%) followed by large (31.67%) and medium (30%) size holdings. Similarly, majority of the periurban dairy farmers had small (70.00%) land holding followed by medium (16.66%) and large (13%) size holdings. The results of the study indicated that rural dairy farmers having higher land holding (6.20 acre) compared to periurban dairy farmers (3.17 acre). The results are on par with study conducted by Thakur (2010).

Economics of local cow milk production: Table 2 narrated that the overall gross maintenance cost per milch local cow in rural and periurban area worked out to be ₹ 72.67 and ₹ 87.80 per day respectively. The cost of green fodder, dry fodder and concentrate feed was ₹ 28.03, ₹ 11.29 and ₹ 6.23in rural dairy farms areas respectively while it was ₹ 28.97, ₹ 15.50 and ₹10.24 in periurban dairy farms. The overall total fixed cost was ₹ 5.56 and ₹ 8.07 and total variable cost was found to be ₹ 67.11 and ₹ 79.73 respectively in rural and periurban dairy farms. Feed cost accounted for the major share of gross cost varying from ₹ 45.55 in rural dairy farms to ₹ 54.71in periurban farms. The results are in line with the study conducted by Feroze (2009) in dairy self help groups of Haryana.

On an average per litre cost of milk production was worked out to be ₹ 32.30 and ₹ 35.84 per milch local cow in rural and periurban dairy farms respectively. The average milk production per milch local cow per day was 2.25 litres in rural and 2.45 litres in periurban farms. Average price realized per litre of milk sold was ₹ 28.39 in rural and ₹ 34.34 in periurban dairy farms. However, gross return was higher in periurban (₹ 88.14) dairy

Table 1. Socio-economic characteristics of rural and periurban dairy farmers.

Particulars	Rural (n= 30)	Periurban (n= 30)
I. Age Group (No.)		
Below 30 years	3 (10.00)	3 (10.00)
30-40 years	6 (20.00)	13 (43.33)
41-50 years	14 (46.66)	9 (30.00)
Above 50 years	7 (23.33)	5 (16.66)
Average age (years)	44	43
II. Education Level (No.)		
Illiterate	8 (26.66)	6 (20.00)
Primary	6 (20.00)	5 (16.66)
Secondary	7 (23.33)	9 (30.00)
PUC	7 (23.33)	7(23.33)
Graduation and above	2(6.66)	3(10.00)
III. Family Size (No.)		
Small (<4 members)	2(6.66)	1(3.33)
Medium (4-6 members)	20(66.66)	21(70.00)
Large (>6 members)	8(26.66)	8(26.66)
Average family size	5.90	6.73
IV. Land Holding (No.)		
Small farmers (< 5 acre)	11(36.66)	21(70.00)
Medium farmers (5- 10 acre)	9(30.00)	5(16.66)
Large farmers (> 10 acre)	10(33.33)	4(13.33)
Average land holding (in acre)	6.20	3.66

Note: Figures in parentheses indicate per cent to total sample

Table 2. Cost and returns of local and crossbred cow milk production (₹ /day/animal)**.**

Sl. No.	Particulars	Local cows		Crossbred cows	
		Rural	Periurban	Rural	Periurban
1	Green fodder	28.03(38.57)	28.97(32.99)	39.40(35.23)	38.20(20.55)
2	Dry fodder	11.29(16.03)	15.50(17.65)	24.06(21.71)	26.90(14.48)
3	Concentrate	6.23(8.57)	10.24(11.66)	13.68(12.34)	76.96(41.48)
4	Total feed cost (1+2+3)	45.55(62.68)	54.71(62.31)	77.14(69.62)	142.06(76.46)
5	Labour	19.72(27.13)	21.24(24.19)	25.62(23.12)	24.64(13.26)
6	Veterinary cost	0.74(1.01)	1.78(2.02)	1.20(1.08)	3.28(1.76)
7	Miscellaneous	1.10(1.51)	2.00(2.28)	1.64(1.48)	2.20(1.18)
8	Total variable cost(4+5+6+7)	67.11(92.34)	79.73(87.80	104.40(94.22)	172.18(92.66)
9	Depreciation on fixed capital	2.96(4.07)	4.23(4.82)	4.24(3.82)	6.42(3.45)
10	Interest on fixed capital	2.60(3.57)	3.84(4.37)	2.15(1.94)	7.20(3.86)
11	Total fixed cost(9+10)	5.56(7.65)	8.07(9.19)	6.39(5.76)	13.62(7.33)
12	**Total cost (8+11)**	72.67(100.00)	87.80(100.00	110.80(100.00)	185.80(100.00)
13	Milk yield (litres/day/animal)	2.25	2.45	4.65	7.20
14	Sale price of milk (₹)	28.39	34.34	25.61	33.73
15	Returns from milk(13*14)	63.88	95.85	119.09	242.86
16	Cost per litre(12/13)	32.30	35.84	28.83	25.81
17	By product value	4.51	4.01	6.23	7.13
18	**Gross return (15+17)**	68.39	88.14	125.32	249.99
19	Net return(18-12)	-4.29	0.343	14.53	64.19
20	Net return per litre(19/13)*	-1.90	0.14	3.12	8.91
21	Returns per rupee of expenditure(18/12)	0.94	1.00	1.13	1.35

*Including returns from by products, Figures in parentheses indicate per cent to total cost

farming compared to rural (₹ 68.39) dairy farming. The daily net return per local milch cow was (₹ -4.29) negative in rural dairy farming compared to periurban (₹ 0.34) dairy farm. Net return per litre of milk production was also negative (₹ 1.90) in case of rural dairy farming compared to periurban dairy farming (₹ 0.14). Further, returns realized per rupee of expenditure in rural and periurban dairy farming was 0.94 and 1.00 respectively. Similar results were reported for local cows by Jadav *et al.* (2016) on economic performance of rural and periurban dairy farmers in south Gujarat indicated negative net returns local in milch animals.

Economics of crossbred cow milk production: Table 3 also indicated that the overall gross maintenance cost per crossbred milch cow per day in rural and periurban dairy farming worked out to be ₹ 110.80 and ₹ 185.80 respectively. The cost of

Table 3. Cost and returns of buffalo milk production (₹/day/animal).

Sl. no.	Particulars	Rural	Periurban
1	Green fodder	30.14 (33.33)	37.08(20.80)
2	Dry fodder	22.29(24.66)	23.90(13.40)
3	Concentrate	11.62(12.86)	74.36(41.70)
4	Total feed cost (1+2+3)	64.05(70.84)	135.34(75.89))
5	Labour	19.62(21.70)	24.32(13.64)
6	Veterinary cost	1.20(1.33)	3.15(1.77)
7	Miscellaneous	1.64(1.81)	2.26(1.27)
8	Total variable cost (4+5+6+7)	85.31(94.35)	165.07(92.56)
9	Depreciation on fixed capital	4.1(4.53)	7.42(4.16)
10	Interest on fixed capital	1.01(1.11)	5.84(3.27)
11	Total fixed cost(9+10)	5.11(5.65)	13.26(7.43)
12	**Gross cost(8+11)**	90.42(100.00)	178.33(100.00)
13	Milk yield (litres/day/animal)	3.04	4.56
14	Sale price of milk (₹)	29.19	42.34
15	Returns from milk (13*14)	88.74	193.07
16	Cost per litre (12/13)	29.74	38.10
17	By product value	7.51	7.25
18	**Gross return (15+17)**	96.24	200.32
19	Net return (18-12)	5.83	21.99
20	Net return per litre (19/13)*	1.92	4.82
21	Returns per rupee of expenditure (18/12)	1.07	1.12

Note: *Including returns from by products; Figures in parentheses indicate per cent to total cost

Table 4. Comparative economics of rural and periurban dairy farms (₹/day/animal).

Sl. No.	Particulars	Rural	Periurban
1	Green fodder	32.52(35.62)	34.75(23.06)
2	Dry fodder	19.21(21.04)	22.10(14.68)
3	Concentrate	10.51(11.51)	53.86(35.76)
4	Total feed cost (1+2+3)	62.25(68.19)	110.70(73.49)
5	Labour	21.65(23.72)	23.40(15.53)
6	Veterinary medicine cost	1.04(1.11)	2.74(1.82)
7	Miscellaneous	1.46(1.60)	2.15(1.43)
8	Total variable cost (4+5+6+7)	85.61(93.78)	138.99(92.26)
9	Depreciation on fixed capital	3.77(4.13)	6.02(4.12)
10	Interest on fixed capital	1.92(2.10)	5.63(3.74)
11	Total fixed cost(9+10)	5.69(6.23)	11.65(7.73)
12	Gross cost(8+11)	91.29(100.00)	150.64(100.00)
13	Milk yield (litres/day/animal)	3.31	4.74
14	Sale price of milk (₹)	27.73	36.80
15	Returns from milk(13*14)	90.57	173.35
16	Cost per litre(12/13)	28.62	33.58
17	By product value	6.08	6.13
18	Gross return(15+17)	96.65	179.48
19	Net return(18-12)	5.36	28.84
20	Net return per litre(19/13)*	1.04	4.63
21	Returns per rupee of expenditure (18/12)	1.05	1.16

Note: *Including returns from by products; Figures in parentheses indicate per cent to total cost

green fodder, dry fodder and concentrate was ₹ 39.40, ₹ 24.06 and ₹ 13.68 in rural dairy farms while it was ₹ 38.20, ₹ 26.90 and ₹ 76.96 respectively in periurban dairy farms. The overall total fixed cost was found to be ₹ 6.39 and ₹ 13.62 and total variable cost was ₹ 104.40 and ₹ 172.18 respectively in rural and periurban dairy farms. Feed cost accounted for the major share of gross cost varying from ₹ 77.14 in rural dairy farms to ₹ 142.06 in periurban dairy farms. In general, pooled analysis revealed that per litre cost of milk production worked out to be ₹ 28.83 and ₹ 25.81 per milch crossbred cow in rural and periurban dairy farms respectively. The average milk production per crossbred milch cow per day was 4.65 litres in rural dairy farms and 7.20 litres in periurban dairy farms. The price realized per litre of milk was ₹ 25.61 in rural dairy farms and ₹ 33.73 in periurban dairy farms.

Further, gross return was higher in periurban (₹ 249.99) dairy farms compared to rural (₹ 125.32) dairy farms. The daily net return realized from crossbred milch cow was ₹14.53 per cow in rural dairy farms compared to ₹ 64.19 per cow in periurban dairy farms respectively. This might be due to higher milk yield and price realization by peri-

urban dairy farms. Net return obtained per litre was ₹3.12 and ₹ 8.91 in rural and periurban dairy farms respectively. The returns realized per rupee of expenditure on crossbred cow in rural and periurban dairy farms were 1.13 and 1.35 respectively. Similar results were reported for crossbred cows by Anbukkani (2015) in his study on economic analysis of dairy farming in dry farming areas of Tamil Nadu.

Economics of buffalo milk production: The overall gross maintenance cost incurred per milch buffalo per day in rural and periurban dairy farms was ₹ 90.42 and ₹ 178.33 respectively. The cost of green fodder, dry fodder and concentrate was ₹ 30.14, ₹ 22.29 and ₹ 11.62 in rural dairy farms while it was ₹ 37.08, ₹ 23.90 and ₹ 74.36 in periurban dairy farms respectively. The total fixed cost was found to be ₹ 5.11and ₹13.26 and total variable cost was ₹ 85.31 and ₹ 165.07 in rural and periurban dairy farms respectively. Feed cost accounted for the major share of gross cost varying from ₹ 64.05 in rural dairy farms to ₹135.34 in periurban dairy farms. The pooled data on per litre cost of milk production worked out to be ₹ 29.74 and ₹ 38.10 per milch buffalo in rural and periurban dairy farms respectively. The average milk production from per milch buffalo per day was 3.04 litres in rural dairy farms and 4.56 litres in periurban dairy farms. The price obtained per litre of milk sold was ₹ 29.19 in rural and ₹ 42.34 in periurban dairy farms. Similarly gross return realized from milch buffalo was high in periurban (₹ 200.32) dairy farms compared to rural (₹ 96.24) dairy farms. The daily net return obtained from per milch buffalo was ₹ 5.83 in rural farms and ₹ 21.99 in periurban farms. Net return per litre of milk production was ₹ 1.92 and ₹ 4.82 in rural and periurban dairy farms respectively. The results are in line with the studies conducted by Meena *et al*. (2010) and Singh (2008). The returns realized per rupee of expenditure on buffalo milk production in rural and periurban farms were 1.07 and 1.12 respectively.

Economics of rural and periurban dairy farming: It is evident from the Table 4 that the gross maintenance cost per standard animal units (SAU) was worked out to be low in rural dairy farm (₹ 91.29) compared to periurban dairy farm (₹ 150.64). The cost of green fodder, dry fodder and concentrate was ₹ 32.52, ₹ 19.21and ₹ 10.51 respectively in rural dairy farms while it was ₹ 34.75, ₹ 22.10 and ₹ 53.86in periurban dairy farms. The overall total fixed cost was ₹ 5.69 and ₹11.65 while total variable cost was ₹ 85.61and ₹ 138.99 in rural and periurban dairy farms respectively. Feed cost accounted for the major share of gross cost varying from ₹ 62.25(68.19%) in rural area to ₹ 110.70(73.49%) in periurban dairy farms. Cost of concentrate was the major component in total expenditure of milk production under both rural and periurban dairy farms. Similar finding was coated by Mahajan *et al*. (2013) who reported that the expenditure on concentrate (₹ 66.76) was another major component in the total cost of milk production followed by green fodder (₹ 24.13) and dry fodder (₹ 18.15). Gross return was higher in periurban dairy farm (₹ 179.48) than the rural dairy farms (₹ 96.65) of Ludhiana district of Punjab.

Further, per day per animal net return was low in rural dairy farm (₹ 5.36) compared to periurban dairy farms (₹ 28.84). The net returns per litre of milk production were found to be high in periurban farming compared to rural dairy farms. These findings are in line with the study conducted by Mahajan *et al*. (2013) who reported that the net return from milk production was much higher in periurban dairy farms than rural dairy farms. The return per rupee of expenditure was higher in periurban dairy farms (₹ 1.16) compared to rural dairy farms (₹ 1.05). Therefore, efforts to be made to increase milk yield in rural area by upgrading local cow and also necessary to conduct awareness training programme on scientific dairy farming practices by the Department of animal Husbandry and Veterinary in collaboration with Karnataka Veterinary Animal and Fisheries Sciences and Farm University of the state.

Though the results are on par with the previous study, only limited studies are there in the study area especially in Southern India. Further, the previous studies were mainly concentrated in the northern states like Gujarat and Punjab where the milk sector was comparatively developed than the southern states like Karnataka. However, the milk sector is rapidly growing in the state of Karnataka. Therefore, the findings of the present study will help the policy makers to draw appropriate policies to further enhance the milk sector in India in general and South India in particular.

Conclusion

The average productivity of milch animal was lowest for local followed by buffalo and crossbred cow. The cost per litre of milk production in periurban dairy farms was higher than rural dairy farms. Similarly, the net returns per litre of milk production were high in periurban farming compared to rural dairy farms. Cost of concentrate was a major component of total expenditure in both rural and periurban farms. The return per rupee of expenditure under periurban dairy farming was higher than rural dairy farming. Therefore, efforts are to be made to increase milk yield in rural area by upgrading local cow and also necessary conduct awareness training programme on scientific dairy farming practices by the Department of animal husbandry and veterinary in collaboration with Karnataka veterinary animal and fisheries sciences and farm Universities of the state.

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