



## An economic analysis of milk production with different types of milch animals

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**ABSTRACT :** The cost of production may be broadly classified as variable costs and fixed costs. The variable costs comprised of green fodder feeds, labour, veterinary expenses, interest on working capital while the fixed costs consists of interest on fixed assets, depreciation on dairy equipments and cattle shed. The total cost came to 9557 per animals per annum of which the variable costs accounted for 76.24 per cent and fixed costs accounted for the rest of Rs. 23.76 per cent of the total cost. The sources of income included sale of milk and dung (FYM) whose sale values was worked out Rs. 11,005/-, Rs.24, 795/- and Rs. 15,192/-, respectively for local cow, crossbred cow and buffalo. Crossbred cows have yielded highest milk / lactation of 2672 litres. The sale of milk came to Rs. 24,047/- at an average price of Rs.9.0 litre. The crossbred cows are genetically potential enough to yield higher quantity of milk. Hence, it was obvious to expect higher returns. The local cows are genetically poor yielders and could provide only 1142 litres per / lactation which was less than half of the crossbred cow. The gross returns of local cow worked out to Rs.11,005/- only.

**KEY WORDS :** Variable cost, Fixed cost, Cross bred, Lactation

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### INTRODUCTION

India stands first in livestock population and is the largest producer of milk in the world. Milk accounts for over 17 per cent of agriculture production the country which has witnessed substantial growth in the dairy sector. Establishment of AMUL in Gujarat was a milk store in dairy industry. Nearly 70 million farm families are engaged in dairy activity. Government of India established NDDDB in 1964 to replicate Khaira District Co-Operative Milk Producers Union pattern of Co-Operative dairying throughout the country on a comprehensive basis and was referred to as operation flood. This programme was designed to help rural dairy farmers to organize into village dairy co-operatives. Karnataka State is forerunner in milk production with third position in the country with regard to

milk production. The state has 13 unions. Due to operation flood programme in Karnataka, the economy of farmers is improving due to higher income and employment generation. In the light of the above, the study was initiated to study in detail about economic aspects of dairying. Karnataka state is the forerunner in milk production ranking third largest milk producer in the country.

### MATERIALS AND METHODS

The study was undertaken in Shimoga district of Karnataka state. It was based on the primary data obtained from 90 milk producers selected randomly from nine villages spread over 3 Talukas of the district at the rate of 10 dairy farmers in each village. Three stage sampling procedure was adopted to select the ultimate milk producers. At the first stage, three Talukas namely, Shimoga, Bhadravathi and Hosanagar having highest population of milk producers were selected. Further, a list consisting of villages in each Taluk with high concentration of dairying was obtained from the village level extension workers. On the same analogy, 3 villages were selected from each taluk which comes to nine. For selection of milk producers, a list of milk producers with at least one local cow, crossbreed and a buffalo was taken from the local extension workers of respective villages. Then, out

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of the said list, 10 milk producers from each village were selected thus making final sample of 90 milk producers. The data were collected from the selected milk producers by survey method with the help of well designed and pre-tested interview schedule. The data covered general information regarding dairy farmers, management practices, costs, returns, constraints etc. The data were analyzed using the conventional tabular method to work out means, percentages etc. Resource efficiency was examined using Cobb-Douglas production function.

## RESULTS AND DISCUSSION

The results of the present investigation as well as relevant discussion have been presented in the following sub heads:

### General characteristics:

The general information of selected milk producers regarding age, education, size of the family and occupation is presented in Table 1. The sample size consisted of 90 milk producers with breakup of 38 small, 32 medium and 20 large milk producers. It is evident from the table that the average age of selected milk producers varied from 43 years in case of large producers to 34 years in large size producers, with an average age of 42 years. Age is an important factor which will influence the attitude of farmers which ultimately affects managerial ability, skill and judgment of dairy business. This indicated that the farmers were in the middle age group with experience in dairy farming. Education is another important influencing managerial ability. As evident from the table that educational score was 8.61 indicating that sample milk producers had better educational status which enabled the dairy farmers to manage their units. The average size of the family was 7 persons. The size of the family affects milk production and consumption. The family size contributes to supply of family labour for management of dairy unit. Dairy enterprise was taken up as a subsidiary occupation with agriculture as the main occupation by all the respondent farmers. It was also

observed that the average landholding of farmers was 2.82 ha, 5.65 ha and 10.22 ha for small, medium and large farmer categories, respectively.

### Size of dairy unit:

The information regarding the dairy unit is given in the Table 2. It may be observed that the per farm size of dairy consist of 2 local cows, 2 crossbred cows and 1 buffalo. The average age of local cow was 5 years, crossbred cow 3 years and buffalo 5 years. The age at first calving was 3 years, 3 years and 4 years, respectively in case of local, crossbred and buffalo. The lactation period ranged from 255 days to 291 days in case of local cows and crossbred cows. The average milk yield was more in case of crossbred cows followed by buffaloes and local cows. The local cow yields about 2.16 litre of milk per day while the crossbred cow gave 6.5 litres. The buffalo on an average yields round 3.5 litres per day. The crossbred cow is genetically a prolific yielder of milk. The milk yield depends on the dairy management practices.

### Cost of milk production:

Table 3 provides the details of cost of production of milk for different kinds of dairy animals *viz.*, local, crossbred cow and a buffalo. The cost of production may be broadly classified as variable costs and fixed costs. The variable costs comprised of green fodder feeds, labour, veterinary expenses, interest on working capital while the fixed costs consists of interest on fixed assets, depreciation on dairy equipments and cattle shed. The total cost came to 9559 per animals per annum of which the variable costs accounted for 76.24 per cent and fixed costs accounted for the rest of Rs. 23.76 per cent of the total cost. The wages of labour formed highest expenditure item at Rs.4419/- constituting 46.23 per cent of the total cost. This indicated that dairy is highly labour intensive and warranted highest expenditure.

This was closely followed by cost of feeds and

**Table 1 : General information of selected milk producers**

Sr. No.	Particulars	Size groups			Overall
		Small	Medium	Large	
1.	No. of milk producers	38	32	20	90
2.	Age (years)	43	48	34	42
3.	Educational score	7.71	8.13	10.00	8.61
4.	Family size				
	Male	3.13 (48.98)	3.15 (47.87)	3.50 (47.61)	3.22 (48.27)
	Female	3.26 (51.01)	3.43 (52.12)	3.85 (52.38)	3.45 (51.72)
	Total	6.39 (100)	6.58 (100)	7.35 (100)	6.67 (100)
5.	Occupation				
	Main agriculture	38	32	20	90
	Subsidiary dairy	38	32	20	--
6.	Landing holding (ha)	2.82	5.65	10.22	6.20

Figures in Parenthesis are percentages to total

**Table 2 : Details of herd size**

Sr. No.	Particulars	Local cow	Cross bred	Buffalo
1.	No. of milch animals perform	2.00	2.00	1.00
2.	Age (years)	5.00	3.33	5.33
3.	Age at first calving (years)	3.50	2.70	4.00
4.	Present order of calving (years)	2.66	2.66	3.33
5.	Inter calving period (days)			
	Lactation	255.00	290.66	266.66
	Dry	271.66	120	193
	Total days	526.66	410.66	459.66
6.	Milk yield (litres)			
	During lactation period	550	1891	890
	Per day	2.16	6.5	3.5

**Table 3 : Cost of milk production**

Sr. No.	Particulars	Local cow	Crossbred	Buffalo
1.	Variable cost			
	Feeds and fodder	2250 (23.54)	3918 (35.21)	2261 (23.20)
	Human labour	4419 (46.23)	4037 (36.27)	4573 (46.92)
	Veterinary expenses	194 (2.03)	273 (2.45)	133 (1.36)
	Miscellaneous	202 (2.11)	222 (1.99)	182 (1.87)
	Interest on working capital	223 (2.33)	265 (2.38)	224 (2.30)
	Total	7288 (76.24)	8715 (78.30)	7373 (75.65)
2.	Fixed cost			
	Interest on fixed capital	872 (9.12)	878 (7.89)	875 (8.98)
	Depreciation on fixed asset	1399 (14.64)	1537 (13.81)	1498 (15.37)
	Total cost	2271 (23.76)	2415 (21.70)	2373 (24.35)
3.	Grand total (I + II)	9559 (100)	11130 (100)	9746 (100)

concentrates accounting for over 23 per cent. The feeds and concentrates are highly indispensable for dairy management without which the milk yield would be low. Examination of cost details of crossbred cow revealed that the total cost of production per cow worked out to be Rs. 11124 per cow / annum with breakup of Rs. 78.31 per cent of variable costs, 21.69 per cent of fixed costs. As usual, the wages of human labour, cost of feeds and concentrates were the major cost components accounting for 36.29 per cent and 35.21 per cent, respectively. The Veterinary expenses was the next highest item of expenditure constituting 2.45 per cent. The cost per litre was worked out to be Rs. 3.88 which is half of the local cow. This is attributed to higher milk yield in case of crossbred cow.

#### Returns from dairy farming:

The details of returns of dairy farming is given in the Table 4. It could be observed that the sources of income include sale of milk and dung (FYM) whose sale values worked out Rs. 11,005/-, Rs.24,795/- and Rs. 15,192/-, respectively for local cow, crossbred cow and buffalo. Crossbred cows have yielded

highest milk / lactation of 2672 litres. The sale of milk came to Rs. 24,047/- at an average price of Rs.9.0 /litre. The crossbred cows are genetically potential enough to yield higher quantity of milk. Hence, it was obvious to expect higher returns. The local cows are genetically poor yielders and could provide only 1142 litres per / lactation which was less than half of the crossbred cow. The gross returns of local cow worked out to Rs.11,005/- only. Buffaloes could provide annual milk 14560 litres.

#### Efficiency of resources in dairy farming:

In order to ascertain the contribution of resources to milk productivity, Cobb-Douglas production function in log linear form was fitted to primary data obtained from dairy farms with herd size, green fodder, dry fodders, concentrates, lactation days, human labour, veterinary expenditure as independent variables and milk production as dependent variable. It may be observed that number of milk animals ( $x_1$ ), green fodder ( $x_2$ ), dry fodder ( $x_3$ ) and concentrates were statistically significant indicating that these variables influenced on milk production

**Table 4 : Returns from dairy farming**

Sr. No.	Particulars	Local cow	Crossbred	Buffalo
1.	Milk yield (lit.)	1142	2672	1332
2.	Sale of milk (Rs.)	10282	24047	14560
3.	Dung (Rs.)	702	748	632
4.	Total of returns (a+b) (Rs.)	11005	24795	15192
5.	Total cost (Rs.)	9559	11130	5446
6.	Net returns (Rs.)	2780.50	13665	7819

**Table 5 : Regression co-efficient of Cobb-douglas production**

Variables	Parameters	Local Cow	Cross bred	Buffalo
Intercept	-	-0.411*	1.731	1.861
Herd size (No.)	X <sub>1</sub>	0.427* (0.211)	0.591* (0.039)	0.427*(0.211)
Green fodder (kg)	X <sub>2</sub>	0.499* (0.131)	0.857* (0.176)	0.137* (0.073)
Paddy straw (kg)	X <sub>3</sub>	0.0340* (0.161)	-0.0250* (0.106)	0.302* (0.140)
Concentrate (kg)	X <sub>4</sub>	-0.377** (0.150)	0.338* (0.032)	0.0271*** (0.0067)
Lactation days	X <sub>5</sub>	-0.4097 <sup>NS</sup> (0.4167)	0.1545 <sup>NS</sup> (0.1461)	-0.3480 <sup>NS</sup> (0.3477)
No of lactation	X <sub>6</sub>	0.5340*** (0.1272)	0.7628 (0.3219)	1.5089*** (0.3293)
Veterinary expenses (Rs.)	X <sub>7</sub>	0.0389 (0.0507)	0.3580 (0.0274)	-0.0163 (0.0209)
Human labour (days)	X <sub>8</sub>	0.1684*** (0.0446)	0.4588*** (0.1125)	0.0962 (0.0493)
R <sup>2</sup>		0.936	0.947	0.894
Returns to scale		3.152	3.6851	2.8625

Figures in parentheses are standard errors

\*, \*\* and \*\*\* indicate significance of values at P=0.01, 0.05 and 0.10, respectively

**Table 6 : Resource use efficiency in milk production of different milch animals**

Resources	G.M.	MPP	MVP	Factor price (Px)	MVP/ Px ratio	Level of resource use
<b>Local cow</b>						
Green fodder (X <sub>2</sub> )	1355.19	0.1323	1.1907	4.0	0.29	Excess use
Paddy straw (X <sub>3</sub> )	242.03	(-)0.1873	(-)1.6857	3.0	0.56	Excess use
Concentrates (X <sub>4</sub> )	81.25	0.0144	0.1296	7.50	0.017	Excess use
Human labour (X <sub>8</sub> )	28.25	8.62	77.58	8.21	9.44	Under use
<b>Crossbred Cow</b>						
Green fodder (X <sub>2</sub> )	3944.57	0.02848	0.2563	4.0	0.064	Excess use
Paddy straw (X <sub>3</sub> )	900.31	(-)0.0625	0.5625	3.0	0.1875	Excess use
Concentrates (X <sub>4</sub> )	857.62	0.0038	0.0342	7.5	0.004	Excess use
Human labour (X <sub>8</sub> )	100.05	3.85	34.65	8.21	4.22	Under use
<b>Buffalo</b>						
Green fodder (X <sub>2</sub> )	1511	(-)0.083	0.7885	4.0	0.197	Excess use
Paddy straw (X <sub>3</sub> )	810.12	0.1446	1.3737	3.0	0.457	Excess use
Concentrates (X <sub>4</sub> )	342.21	0.2184	2.0748	7.5	0.276	Excess use
Human labour (X <sub>8</sub> )	34.83	2.66	25.27	8.21	3.07	Under use

(Table 5 and 6). The variables such as lactation days (x<sub>5</sub>), veterinary expenses (x<sub>7</sub>) were not significant indicating that these do not contribute to milk production. The independent variables included in the function explained the variation in milk production to an extent of 93.60 per cent. The sum of regression co-efficient were 3.1520, 3.6851 and 2.8625 indicating increasing returns to scale in local cow, crossbred cow and buffalo. When all the resources are increased simultaneously by one per cent, the income from dairy increases by 3.1520 %, 3.6851 per cent, 2.8625 per cent, respectively in local cow, crossbred cow and buffalo. The production analysis has indicated that there was further scope to increase milk

production through reorganization of resources. This analysis has shown that it was possible to utilize the full potential of local cows with better management of resources. Devraj (2001), Kumar and Kumar (2003), Ganesh Kumar (2000) and Ganesh Kumar *et al.* (2003) also made some observation pertaining to the present investigation.

### Conclusion:

The study was undertaken in Shimoga district of Karnataka State in order to throw light on economic aspects of dairy farming. The study was based on primary data obtained from 90 dairy farmers. That data were analyzed using budgeting / tabular method of analysis and production function analysis. The study indicated that the dairy farmers were relatively young with moderate education and family size of 7 members. The milk production was higher in case of crossbred cows and buffalos. The local cow yielded only 2.16 litres of milk per day while the crossbred cow yielded 6.5 litres. The cost of milk production worked out to Rs. 9,559, Rs.11,130 and Rs.9,746, respectively in case of local cow, crossbred cow and buffalo. It was observed that the crossbred cow generated highest net income of Rs.13,665 followed by buffalo with Rs.7,819. The production function analysis showed that the variables of number of milch animals, green fodder and concentrates found statistically significant indicating that these variables influenced milk production to greater extent. The sum of regression co-efficients indicating increasing returns to scale.

This analysis indicated that there is further scope to increase milk production through reorganization of resources.

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