

Original Research Article

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Cost and Returns Structure of Dairy Enterprise in the Selected Watershed Areas of Koppal District of Karnataka

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ABSTRACT

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The study was conducted to analyse the economics of dairy enterprise in selected watershed of Koppal district of Karnataka. The cost and return structure of dairy enterprise was analysed. Proportion of variable cost to the total cost accounted 77.39 per cent, 77.92 per cent and 82.99 per cent respectively and the remaining was fixed cost. The total fixed cost incurred was ` 9520.75 for cross breed cow, ` 7437.19 for buffalo and ` 4395.79 for indigenous cow. The net returns obtained were ` 17359.88, ` 10338.46 and ` 1366.98 for cross breed cow, buffalo and indigenous cow respectively. The dairy enterprise with cross breed cows and buffaloes were found profitable with a benefit cost ratio of 1.42 and 1.31 respectively, while the dairy enterprise with indigenous cows was not getting much profit with a benefit cost ratio of 1.05.

Introduction

The world population is expected to touch 9.19 billion by 2050. Most of the increase in population is expected in developing countries in Asia and Africa (5.33 and 1.66 billion, respectively). Each year an additional 0.25 billion metric tons of grain must be produced to feed the increased population of world, which is 21 per cent increase in food production each year. Increasing water scarcity over large parts of the world and increased withdrawal of water for agriculture from 2500 km³ in 2000 to 3200 km³ by 2025 has attracted the attention of policy makers and researchers for achieving food and water security. It is estimated that by 2025, one

third of the world's population (especially in the developing countries) would face severe water scarcity resulting into water conflicts (Seckler and Amarasinghe, 2000). In order to achieve food security, minimize the water conflicts and to reduce poverty level, it has become essential to increase productivity of rainfed systems by harnessing the existing potential in production (Wani *et al.*, 2003). Globally, 80 per cent of agriculture is rainfed and contributes 60 per cent to world's food basket. Current productivity level of rainfed agriculture is as low as one tonne per hectare.

The biggest crisis that the world faces in the 21st century is the crisis of water. Water is indeed a renewable resource but, in any given

year, it is not inexhaustible. The crisis of water has affected the lives of millions of the farmers who constitute sizeable portion of the population. As per the water scarcity map published by International Water Management Institute (IWMI), major part of the India is going to face physical water scarcity while, the remaining part is going to experience economic water scarcity by 2025 (Seckler and Amarasinghe, 2000). India's population of 1000 million is growing at the rate of 2.11 per cent every year. Addition of over 17 million people each year makes additional demands on the country's natural resources and reduces the gains of development (Itinal *et al.*, 2008). Due to population rise and diversion of land to non-agricultural purposes, the availability of cultivable land in India has declined from 0.53 hectare per capita in 1951 to less than 0.2 hectare by end of the decade of this century. This small piece of land per individual, not only to produce required quantity for every individual in the past, but also to produce much more than that to provide for the increased demand resulting from the improved standard of living as well as increase in the population.

Materials and Methods

The present study was conducted in the selected watershed areas in Koppal district. The district was selected purposively for the study. Under the Sujala-III project titled Support for improved integration in rainfed areas of Koppal district of Karnataka". Three sub-watershed have been selected from Koppal District, from each selected sub-watershed two micro-watershed had selected. From each selected micro-watershed 40 sample farmers were selected randomly making the total of 80 sample farmers for each sub-watershed. Thus, the total sample comprised of 240 farmers for all three sub watersheds together.

Analytical tools employed

Budget technique

Cost of milk production

It is pertinent to study the cost of milk production, since it enables to comprehend the intricate issues involved in milk production and is the most important indicator of economic efficiency of milk production. The various cost components identified can be broadly classified into 'fixed costs' and 'variable costs'. An attempt has been made in this section to briefly elaborate these costs.

Fixed costs

Fixed costs include the cost, which remain unchanged over the short period of time. The relevant components of fixed cost that go into milk production are:

Depreciation costs

It is loss in the value of an asset due to normal wear and tear, resulting out of its use over time and technological obsolescence. The depreciation on cattle sheds and dairy equipments was worked out by using straight-line method considering their useful economic life. An annual depreciation of 5 per cent on 'Pucca' shed and fodder stores, 10 per cent on 'Kuccha' shed and fodder stores were assumed. The depreciation on equipments like milking cans, water cans, buckets, wooden feed manger and utensils was taken as 20 per cent. The depreciation rates for consumable items like gunny bags, rope etc. was taken as 100 per cent considering that the farmer replaces the above items annually. Depreciation rates for manual (or power driven) and bullock drawn chaff cutters were assumed as 10 and 20 per cent, respectively. The depreciation on milch local cows, and buffaloes were calculated by straight line

method and rates of deprecation were considered as 12 and 10 per cent, respectively, assuming a productive life of 8 years for local cows and 10 years for buffaloes. The annual depreciation expenses were apportioned on the basis of per Standard Animal Units (SAUs).

Interest on fixed capital

The value of animals, cattle shed and dairy equipments related to milk production was taken as fixed capital. The interest on fixed capital was calculated at the prevailing rate of 9.50 per cent per annum that matches the interest rate being currently charged by the commercial banks in the study area. The annualized interest amount was calculated and apportioned per standard animal unit per day. The interest on working capital was not taken into consideration as the households get income from milk sold everyday.

Variable costs

By definition, variable costs are those costs that vary with the levels of milk production. Variable costs included those recurring components in milk production, which are incurred on green fodder, dry fodder, concentrates, labour and miscellaneous expenses. The procedure followed to work out the various variable cost components is provided as under.

Cost of feeds and fodder

Cost of green fodder, dry fodder and concentrates were estimated by multiplying the quantity fed by prevailing market price in the winter, summer and rainy seasons in the study area. In case of grazing of animals for feeding, the charges paid by the households as well as wages paid to labour were taken into account to determine its cost.

Labour cost

The labour expenses comprised of hired and family labour cost. However, hired labour was not engaged in the dairy activities in the study area.

Hence, labour cost comprised of only value of family labour imputed at the prevailing wage rate in the study area. Total time devoted for various dairy operations was taken into account while estimating labour cost.

Veterinary expenses

The actual expenses incurred on health care, veterinary medicine, vaccination of milch animals during the past three seasons was recorded by personnel enquiry method.

Miscellaneous expenses

These expenses included cost of repairs, electricity and water charges, etc., incurred by the selected households.

Gross cost

The gross cost of milk production was computed as the sum total of fixed costs and variable costs. It reflects total implicit and explicit costs that are incurred in milk production.

Unit cost of milk production

The net cost of maintenance per milch animal per day was divided by the respective average milk yield per milch animal per day to arrive at per litre cost of milk production.

Productivity of milch animals was worked out as follows

$$\text{Average productivity of animals} = \frac{\text{Total milk production}}{\text{Number of milch animals}}$$

Income from milk production

The income from milk production was calculated as follows

Gross income

It was worked out by adding the value of milk and imputed value of dung produced by milch bovines in the sample household.

Net income

This is the true income to the household from different sources apart from dairy and crop activities. In case of dairy activity, it was computed by deducting gross cost from gross income.

Benefit -Cost ratio

It was worked out by dividing gross income by total cost of milk production.

Results and Discussion

Cost and returns structure of dairy enterprise in the selected watershed areas in Koppal district

Cost structure of dairy enterprise in the selected watershed areas in Koppal district (per animal per year)

Inputs used and their cost per animal in the dairy enterprise in the study area were presented in Table 1 indicated that, the cost of green fodder was highest for cross breed cows (₹4997.01) followed by buffalo (₹4563.83) and then lowest for indigenous cow (₹3140.5) and ranged from 11.87 to 13.55 per cent of the total cost. The dry fodder cost was also more in case of cross breed cows (₹4514.14) followed by buffalo (₹3904.41) and then by indigenous cow (₹2904.5) ranged between 10.72 to 11.59 per cent. The cost of

concentrates was ₹11886.8, ₹7264.87 and ₹5878.82 for cross breed cow, buffalo and indigenous cow respectively accounted 21.57 to 28.23 per cent of total cost. The results showed that the cross breed cows consume more inputs like dry fodder, green fodder and even the concentrates followed by buffaloes and indigenous cows. Veterinary expenses for cross breed cow, buffalo and indigenous cow were ₹883.33, ₹712.67 for buffalo and ₹497.33 for indigenous cow. The labour cost was ₹8166.67, ₹8046.67 and ₹7626.67 for cross breed cow, buffalo and indigenous cow respectively. The total variable cost was ₹32579.3, ₹26239.01 and ₹21451.16 for cross breed cow, buffalo and indigenous cow respectively. Proportion of variable cost to the total cost accounted 77.39 per cent, 77.92 per cent and 82.99 per cent respectively and the remaining was fixed cost.

The total fixed cost incurred was ₹9520.75 for cross breed cow, ₹7437.19 for buffalo and ₹4395.79 for indigenous cow. Among the different items of fixed costs, depreciation on animal was the highest in all the cases. In case of cross breed cow it was ₹6680, in case of buffalo it was ₹4846.67 and Rs 2727.33 for indigenous cow. The other items like depreciation on building, machinery and interest on fixed cost were of minor importance. The total cost was ₹42100 for cross breed cows ₹33676 for buffalo and was ₹25846.95 for indigenous cow.

Income from dairy enterprise in the selected watershed areas in Koppal district

The results depicted in Table 2 revealed the income from dairy enterprise in selected watershed areas in Koppal district. Returns in dairy enterprise realized was by three ways: milk is the main product of dairy enterprise contributing highest to the gross returns. The milk yield per animal per year was 2232 litres by cross breed cow, 1197 litres by buffalo and

981 litres by indigenous cow. The returns obtained from sale of milk were `55800 in cross breed cow, `40698 in buffalo and `23430 in indigenous cow. By selling the manure the respondents have obtained `3783 in case of indigenous cow, `3660 in case of cross breed cow and `3316 in buffalo. Total returns were `59460 in cross breed cow, `44014 in buffalo and `27213 in indigenous

cow. The net returns obtained were `17359.88, `10338.46 and `1366.98 for cross breed cow, buffalo and indigenous cow respectively. The dairy enterprise with cross breed cows and buffaloes were found profitable with a benefit cost ratio of 1.42 and 1.31 respectively, while the dairy enterprise with indigenous cows was not getting much profit with a benefit cost ratio of 1.05.

Table.1 Cost structure of dairy enterprise in the selected watershed areas in Koppal district (₹ per animal per year)

Sl. No	Particulars	Buffalo		Cross-breed cow		Indigenous cow	
		Cost	Percentage	Cost	Percentage	Cost	Percentage
1	Green fodder	4563.83	13.55	4997.01	11.87	3140.5	12.15
2	Dry fodder	3904.41	11.59	4514.14	10.72	2904.5	11.24
3	Concentrates	7264.87	21.57	11886.8	28.23	5878.82	22.74
4	Veterinary expenses	742.67	2.21	883.333	2.10	497.33	1.92
5	Labour	8046.67	23.89	8166.67	19.40	7626.67	29.51
6	Interest on working capital@7%	1716.57	5.10	2131.36	5.06	1403.35	5.43
A	Total variable cost	26239.01	77.92	32579.3	77.39	21451.16	82.99
1	Depreciation building	1485.33	4.41	1558.93	3.70	974.94	3.77
2	Depreciation animal	4846.67	14.39	6680	15.87	2727.33	10.55
3	Depreciation on machinery	308.34	0.92	261.76	0.62	222.53	0.86
4	Interest on fixed capital@12%	796.84	2.37	1020.08	2.42	470.98	1.82
B	Total fixed cost	7437.19	22.08	9520.78	22.61	4395.79	17.01
	Total (A+B)	33676.20	100	42100.1	100.00	25846.95	100

Table.2 Income from dairy enterprise in the selected watershed areas in Koppal district (₹ per animal)

Sl. No.	Particulars	Buffalo	Cross-breed cow	Indigenous cow
1	Milk yield/lactation (ltr.)	1197.00	2232.00	981.00
2	Sale of milk	40698.00	55800.00	23430.60
3	Sale of manure	3316.67	3660.00	3783.33
4	Total returns	44014.67	59460.00	27213.90
5	Total cost	33676.20	42100.12	25847.00
6	Net returns	10338.46	17359.88	1366.98
7	Cost/litre of milk	28.13	18.86	26.35
8	Returns /litre of milk	34.00	25.00	23.90
	BCR	1.31	1.42	1.05

Cost and returns structure of dairy enterprise in the selected watershed areas in Koppal district

Cost structure of dairy enterprise in the selected watershed areas in Koppal district (per animal per year)

Dairy farmers incur cost on variable inputs such as green fodder, dry fodder, concentrates, grains, veterinary medicines and labour charges and fixed inputs like depreciation value of animal, depreciation value of cattle shed, machinery *etc.* The results of the Table 1 revealed that among the cost of inputs, share of variable inputs cost (77.39% to 82.99%) was more. All the constituents of feed like dry fodder, green fodder and concentrates were used at a higher quantity for cross breed cows (₹32579/animal) and buffaloes (₹26329/animal) in expectation of getting higher milk yield, as the average milk yield in the study area was 2232 litres for cross breed cows and 1197 litres for buffaloes.

The strong desire to increase milk yield coupled with lack of knowledge have forced the respondents to overfeed their animals. The cost on feed and fodder consumption is low in indigenous cow as the local breeds are less feed consumers.

The cost of veterinary medicines was least in case of indigenous cows, as they are resistant to diseases like mastitis, mad cow disease, tick fever and also resistant to parasites like ticks.

Among the fixed inputs, depreciation value of animal was having major share. Higher value of depreciation was observed for cross breed cows and buffaloes, this is because of the higher purchase price of cross breed cows and buffaloes. The other major constituent of fixed inputs was depreciation on cattle shed;

The depreciation value on cattle shed was less as most of the farmers construct the cattle sheds using locally available materials like bamboo poles, coconut fronds *etc.*

The main objective of dairy farming is to maximize the milk production; this was fulfilled by feeding the animal with the green and dry fodder as well as concentrates. Thus, the feed charges formed more than half of the costs incurred in rearing. Total cost per animal per year was also higher for cross breed cows and buffaloes than indigenous cows as more inputs were used. Similar opinions were expressed by Mahajan *et al.*, (2013).

Income from dairy enterprise in the selected watershed areas in Koppal district

The analysis of economics of in milk production showed returns on dairy unit were obtained in two ways; milk was the major source of returns as it is the main product in the production process. By using the dung and litters of the left over fodder on the floors of the shed, farm yard manure was prepared which was the additional source of revenue in dairy enterprise.

Returns obtained per animal from milk production were more in case of cross breed cow (₹55800) and buffalo (₹40698), as the average milk yield was more. Thus, gross returns were higher in case of cross breed cow (₹44015) and buffalo (₹44015) milk than indigenous cow (₹27214), which was mainly because of higher milk yield of cross breed cow and buffalo. Similarly, net returns were also more in case of cross breed cow and buffalo. The cross breed cow and buffalo milk production was found more profitable in the study area with a high magnitude of benefit cost ratio of 1.42 and 1.31 respectively when compared to indigenous cow (1.05).

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