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RESEARCH ARTICLE :

Study of economic feasibility of dairy farming under IFS in NEK region of Karnataka

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SUMMARY : Dairy farming from being a traditional family run business, today has grown hugely to an organized dairy industry with technology specialization in every part of process we have tremendous growth in dairy farming. Karnataka has 30.52 million of livestock, comprising 10.50 million of cattle, 4.32 million of buffalo, 9.55 million of sheep and 6.15 million goat. North-Eastern Karnataka has 7.32 million of livestock, comprising of 2.22 million cattle, 0.95 million buffaloes, 2.34 million sheep and 1.79 million goat. As IFS components content dairy as one enterprise it is important to study the feasibility of dairy in IFS. This paper attended to find out the economic feasibility of dairy in IFS and impact on employment generation and livelihood security. The data was collected from 60 IFS and 60 Non-IFS sample farmers from three districts of NEK region. The tabular analysis and discounting measures are used for cost and returns calculation and for comparing financial feasibility. It is observed that the practice of dairy in IFS found to be profitable in terms of income and employment generation.

KEY WORDS :
Dairy, IFS, Financial feasibility, Employment generation

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BACKGROUND AND OBJECTIVES

Karnataka is the 8th largest state in India with an area of 1.91 lakh sq km. It is situated between 11.5° and 19.0° North latitude and between 74.0° and 78.0° East longitude in the southern plateau. The average annual rainfall of the state is about 1139 mm from both South-West and North-East monsoon. The mean temperature ranges from 10.0° C to 44.0°C. According to 2007 livestock census, Karnataka has 30.52 million of livestock, comprising 10.50 million of cattle, 4.32 million of buffalo, 9.55 million of sheep and 6.15 million goat. North-Eastern Karnataka has 7.32 million of livestock, comprising of 2.22 million cattle, 0.95 million buffaloes, 2.34 million sheep and 1.79 million goat.

NEK region comprising of six districts, *viz.*, Bidar, Bellary, Koppal, Gulbarga, Raichur and Yadgir lag behind and has very poor per capita income. The NEK has been a dry and backward region in terms of agricultural development. Besides, the rate of public and private investments in this region has been low and hence these reasons continue to remain agriculturally backward. Due to the absence of adequate agricultural inputs the state has not been able to effectively participate in

industrial change besides failing to make any strong forays in industrial development except in the regions surrounding the cities of South Karnataka. This emphasizes the agricultural backwardness of the region, which is intrinsically associated with the poor industrial scenario in the northern eastern regions of the state.

The agricultural backwardness, particularly of the northern districts in the state has been the cumulative outcome of the small land holdings, diversified crop system, lack of assured irrigation, lack of basic infrastructure for supply of inputs and marketing facilities for the agricultural products, inadequate growth of non-farming activities such as dairy and poultry. Apart from the dry and rain-starved topography of the region, the size of land holding and pattern of land ownership determines to a large extent, the magnitude of gains that can be derived from the farming sector through adopting advanced technology as well as mechanization of agriculture. As IFS demands small land holdings with improved irrigational facilities. Moreover, the growing economic inability of the farmers in northern districts of the state forced them to embrace or adopt traditional land tilling and cultivation methods. It was as low as 1.3 per cent, 3.4 per cent and 3.2 per cent of state irrigated area, respectively in the year 2012-13. The marked regional imbalances in irrigation facilities and subsequent failures of crops have created a drought situation in North Karnataka. It has manifested in the continuing spate of suicides among farmers in North Karnataka.

Currently, livestock is one of the fastest growing agricultural subsectors in developing countries. Its share to total GDP is around 3.9 per cent and is largest segment of the agricultural sector. This growth is driven by rapidly increasing demand for livestock products, driven by population growth, urbanization and increasing incomes. The Net Domestic Product from agriculture and allied activities is Rs. 1179341 crores out of which livestock sector contributes Rs. 4,59,051 crores of value of output (Basic Animal Husbandry Statistics (2013), Department of animal Husbandry, Dairying and Fisheries, GOI). In livestock sector, dairy has emerged as an important sub sector as it contributes Rs. 305484 crores of value of output to livestock sector in the year 2011-12 and milk production is 127.9 million tonnes in the same year. Karnataka stands 11th in milk production producing 54 lakh tonnes of milk in 2011-12. Hence, dairying has become an important source of income for millions of rural families and has assumed an important role in providing employment and income generating opportunities. The bovine population in milk in both in the country and the state for the year 2011-12 is shown in Table I which reveals that the country had 12.294 million exotic / cross bred cows in milk; 32.007 indigenous / non descript cows in milk and 38.193 million buffaloes in milk. Perusal of milch animal population in the state *vis a vis* nation implied that Karnataka state comprised about 8.69 per cent, 5.08 per cent and 4.58 per cent of exotic/ cross bred cow, indigenous / non - descript cows and buffaloes in milk, respectively, (Basic Animal Husbandry Statistics (2013), Department of animal Husbandry, Dairying and Fisheries, GOI).

RESOURCES AND METHODS

This chapter deals with the description of the study area, the sampling technique adopted, the method of survey, the nature and sources of data and the various tools and techniques employed in analysing data. At the end of the chapter, important concepts used for the study are also defined and explained to facilitate a clear understanding of the issues with which the present study is concerned.

Study area :

The study was conducted in North Eastern region of Karnataka (NEK), which constituted six districts namely Bidar, Kalaburagi, Yadgir, Raichur, Bellary and Koppal. The entire area of NEK falls under the jurisdiction of University of Agricultural Sciences, Raichur (UASR). The UAS, Raichur has been implementing Integrated Farming System (IFS) under RKVY project of the Government of India in NEK region since 2011-2012.

Sampling procedure :

The multistage random sampling method was adopted for selection of sample respondents. In NEK region, 3 districts namely Raichur, Kalaburgi and Yadgir have been selected purposively in the first stage as 53.84 percent of the IFS beneficiaries are located in these three districts (Table A). In second stage, 2 RSKs have been selected randomly from each district. In the third stage, 20 farmers, from each RSK have been selected which comprising10 IFS farmers from RKVY project of UAS, Raichur and 10 Non-IFS farmers have been selected randomly. Finally 40 respondents from each district have

been selected constituting total sample size of 120 respondents.

Table A: Distribution of beneficiaries under RKVY project in the study area

Sr. No.	Name of the district	No. of. beneficiaries	Per cent
1.	Raichur	79	18.42
2.	Yadgir	45	10.48
3.	Kalaburgi	107	24.94
	Sub total	231	53.84
4.	Bidar	75	17.48
5.	Bellary	60	13.99
6.	Koppal	63	14.69
	Sub total	198	46.16
	Total	429	100.0

Nature and source of data :

Both primary and secondary data have been collected to fulfil the objectives of the study. The primary data collected using pretested questionnaire from both IFS and Non-IFS farmers on socio-economic features, farming system practiced, cost and returns and resource use efficiency. Secondary data on land utilization pattern, size of land holding and prices of agriculture commodities were collected from published sources *viz.*, Directorate of Economics and Statistics (DES), Bengaluru and reports of Krishi Maratha Vahini.

Analytical tools :

The collected data was analyzed using simple frequency, bivariate and multi-variate analysis. Specifically tabular analysis, averages, percentages, were used to arrive at meaningful conclusions.

Cost and returns in livestock enterprises :

The cost and returns in livestock enterprises under each farming system in the study area was calculated per animal, later arrived at cost and returns of livestock enterprises per hectare by taking average number of dairy animals reared on per hectare of land owned by sample respondents under each farming system by using the formula given bellow:

$$\text{Number of dairy animals / hectare} = \frac{\text{Total number of dairy animals}}{\text{Total land holding}}$$

The costs in livestock enterprises include establishment cost and operational cost.

Establishment cost:

Establishment cost includes cost on building, machinery and equipments. The actual cost of animals purchased and the imputed value at prevailing market rates for animals born on the farm were considered as establishment costs.

In case of livestock enterprises, depreciation was calculated using the diminishing balance method. At the end multiply already available written down value of animal by r/100.

$$\text{Depreciation} = \frac{\text{Value of animal x rate of interest}}{100}$$

Operational cost:

Operational cost include cost on feed, hay, green fodder, veterinary charges, depreciation on machinery, equipments and building, labour wages and miscellaneous expenses.

Feeds and concentrates:

Purchase price plus transportation costs and self-produced feeds were evaluated at actual costs.

Fodder and hay:

The actual purchase cost plus transport costs and stocking charge, self produced fodder and hay was evaluated at actual production charges.

Returns:

The price received by farmers on sale of milk was obtained along with the yield of milk and returns were calculated accordingly. The valuation of by-products, manure in case of dairy were added to the total returns.

In dairy, local cows, cross breed cows and buffaloes were clubbed to work out costs and returns.

Discounting measures:

The discounting measures are used to calculate present value of future income. In the present study discounting measures are used in calculation of cost and returns from different IFS components.

Discounting factor:

It is the parameter for finding the net present value future income.

$$\text{Discounting factor (DF)} = P/(1+R)^n$$

where,

P= Present value

R= Rate of interest

N= Years

Discounting Cost (DC) = DF * Total cost

Discounting Return (DR) = DF * Total returns

Net Present Value (NPV) = DF * Net returns

Returns at rupee of investment = Total discounting returns / total discounting cost.

OBSERVATIONS AND ANALYSIS

Almost all the IFS sample farmers had dairy component in the study area. The cost and returns realised for 2 cows and a buffalo was worked out. The discounted cost and returns of dairy enterprise carried out by IFS farmers was worked out and presented in Table 1. The discounted cost of dairy enterprise was be Rs.7,48,011. Similarly, the discounted returns per unit (2 cow+1 buffalo) of dairy enterprise was Rs.13,02,845 with a net returns of Rs.5,54,834. It is to be noted that dairy enterprise was highly profitable as indicated by returns per rupee of investment (2.09). Further Internal Rate of Return (IRR) was 247 per cent and is higher than prevailing bank rate (10.50%). Hence, almost all the farmers have included dairy component in the IFS farming system because of profitable enterprise with regular returns as well as employment.

The dairy farming is another most profitable enterprise included in the IFS component and is a source of subsidiary income to small and marginal farmers and agricultural labours. With return per rupee of investment Rs. 1.74. Therefore, dairy unit in IFS component in addition to milk, it also acts as a good source of organic matter for improving soil fertility and crop yields. Further the dung is used as a fuel for domestic purpose and the

Table 1 : Cost and returns of dairy component of IFS farmers **(Rs./unit) ***

Year	Total cost	Gross returns	Net return	Discounting factors (@12%)	Discounted cost	Discounted returns	Discounted net returns
0	195000	110000	-85000	1.00	195000	110000	-85000
1	90000	194130	104130	0.90	81818	176482	94664
2	90000	194130	104130	0.82	74380	160438	86058
3	90000	194130	104130	0.75	67618	145853	78234
4	90000	194130	104130	0.68	61471	132593	71122
5	90000	194130	104130	0.62	55883	120540	64657
6	90000	194130	104130	0.56	50803	109581	58779
7	90000	194130	104130	0.51	46184	99619	53435
8	90000	194130	104130	0.46	41986	90563	48577
9	90000	194130	104130	0.42	38169	82330	44161
10	90000	194130	104130	0.38	34699	74846	40147
Total					748011	1302845	554834
Returns per rupee of investment				1.74			
Discounted net return				554833.8			
IRR				122 %			

Note: *Second year onward values are projected Unit = 2 cow and 1 buffalo

Table 2 : Comparative analysis of different IFS components

IFS components	Total cost	Gross return	Net return	Return at per rupees investment	Employment generation (Man days/ha/year)
Crop	10343	16638	6295	1.6	217
Sericulture	22080	38220	16140	1.73	229
Vermicomposting	166309.5	208729.7	42420.2	1.25	272
Horticulture	122527.9	260506.4	137978.4	2.12	277
Dairy (2+1)	951150	1992893	1041743	2.09	253
Goat	54267.86	143209.4	88941.54	2.63	235
Sheep	46901.33	116968.4	70067.07	2.49	235

surplus fodder and agriculture by products are utilised for feeding the animals.

Since agriculture is seasonal in nature, dairy farming provides employment throughout the year for their family members. Therefore, dairy farming need to be encouraged through different government programmes as majority of beneficiaries with dairy as subsidiary occupation as for small and marginal farmers. The results are in line with study conducted by Alagumani and Anjugam (2000) on impact of dairy enterprises on income and employment in Madhurai district of Tamil Nadu. Kandasamy (1998) analyzed economics of integrated farming systems at Pariyar in Tamil Nadu. He reported that among the different farming system practices, dairy-based system was found to be more profitable than others. The next best system was dairy cum poultry based mixed farming with a mean annual net income of Rs.5,899 per ha with per day income of Rs. 16.16. Poultry based mixed farming system observed net income of Rs. 2,287 with per day income of Rs. 6.27 over pure cropping system which recorded mean annual net income of Rs. 2,219 with per day income of Rs. 6.08. Farmers method of sole cropping could give the least mean annual net income of Rs. 1,902 and Rs. 5.21 of per day income.

The costs and returns of the different IFS components were worked out. Through Table 2 it is easy to note that the highest profit is obtained from goat rearing as the returns per rupee of investment is high 2.63 followed by sheep rearing, dairy, sericulture, horticulture and crop were 2.49, 2.09, 1.73 and 1.63, respectively, further additional income can be obtained by vermicomposting with net return Rs. 42420.2. It is interesting to note that over all the livestock components have more profit rather than crop component, its due to the market values and high demand in the market for these products. The IFS module with dairy component provided regular employment and income throughout the year, which helped in improving standard of living and livelihood security of IFS farmers, the results are inline with Gaur (2002) conducted a study on factors influencing animal husbandry practices of dairy in Anand and Vadodara district of Gujarat state and found that slightly less than half of the dairy farmers (47.67%) had dairying and agriculture occupation under two tier production system, followed by 47.10 per cent of them had dairying, agriculture and other occupations and only 5.23 per cent of them had a sole dairy occupation.

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