

Production status of cross bred cattle and its contribution to livelihood security of dairy farmers in Karnataka

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(Received: June, 2024 ; Accepted: August, 2024)

DOI: 10.61475/JFS.2024.v37i3.15

Abstract: Cross bred cattle have major contribution in fulfilling the demand of milk by the growing population of India. Among various categories of dairy animals, the productivity was higher in crossbred cattle. The present study was carried out in eight KVK jurisdiction area four each from south and north in Karnataka. From each KVK jurisdiction area 30 dairy farmers were selected randomly, making the total sample size of 240 farm households. Data were collected through interviews schedule and analysed. The study revealed that the sample households had more number of milking cross bred cattle (2.08) in south Karnataka as compared to north (1.96). Total feed cost and expenditure per animal was more in case of north Karnataka (₹ 116.83 and 161.92, respectively) than south (₹ 111.86 and 156.93 respectively). South Karnataka dairy animals were producing more milk (9.64 L/anim./day) as compared to north (9.48 L/day). Net return/day per animal (₹ 111.73) was more in case of south Karnataka as compared to north (₹ 103.34). Net return/day per litre (₹ 11.09) and per farm (₹ 236.186) was more in south Karnataka as compared to north (₹ 9.83 and 210.13, respectively).

Key words: Crossbred cattle, Dairy farming, Livelihood, Production

Introduction

Livestock provides livelihood to two-third of rural community. It also provides employment to about 8.8% of the population in India. India has vast livestock resources. Livestock sector contributes 4.11% GDP and 25.6% of total Agriculture GDP. India is World's highest livestock owner at about 535.78 million. Out of this 192.49 million is cattle population *i.e.* 151 million indigenous and 39.732 million crossbred cattle, and 110 million buffalo population (20th Livestock Census, 2019). Indian dairy sector produced 230.6 million tons of milk. The per capita availability of milk has also increased from 112 grams per day in 1968-69 to 459 gram per day in 2022-23 which is comparable to the world average (Basic Animal Husbandry Statistics, 2023). Karnataka stands 9th in milk production, produced 128.29 lakh tonnes of milk in 2022-23. In Karnataka, about more than 0 percent of milk was contributed by the cows and rest by buffaloes. Among cow milk, contribution of cross bred was immense *i.e.* more than 75 per cent than indigenous cows. Among various categories of dairy animals, the productivity was higher in cross bred cows, followed by buffaloes, non-descript cows and goat (Basic Animal Husbandry Statistics, 2023).

Dairy animals are playing crucial role in the national economy through supply of milk, dung, fuel etc. and they are major source of income for many families in India especially the resource poor who maintain few heads of animals. Dairy animals if in milk provide regular income to the livestock farmers through sale of milk. In spite of the enormous livestock resources, the per capita availability of milk protein source in India is much lower due to several factors *viz.*, low productivity of indigenous and non-descriptive animals having poor productive genetic potential, inadequate adoption or ignorance about scientific

animal husbandry technologies, scarcity of feed and fodder, lack of skills in scientific husbandry, less knowledge in housing and health management, frequent outbreak of diseases, limited availability of inputs like credits, veterinary services, training on scientific animal husbandry practices *etc.* (Rao *et al.*, 2008).

Hence, farmers must be made aware of various scientific technologies to improve livestock production which is possible through effective livestock extension activities such as Krishi Vigyan Kendras. Many of the farmers show reluctance to adopt new technologies towards scientific animal husbandry due to lack of knowledge, improper exposure to the technologies, low motivation, lack of confidence in new technology and ignorance on its benefits. So, by providing suitable need based trainings, conducting frontline demonstrations and through other extension activities KVKs are helping farmers to improve their vocational skills leading to better adoption of new technologies. Considering the above facts, present study entitled "Production status of cross bred cattle and contribution to livelihood security of dairy farmers in Karnataka" were undertaken.

Material and methods

The present study was carried out purposively in Karnataka as it is 9th largest milk producing state in India. The sampling scheme adopted for this study was three-stage stratified random sampling without replacement. Study was carried out in the eight KVK jurisdiction area four each from south and north in Karnataka. From each KVK jurisdiction area, two cluster of villages were selected randomly based on sizable dairy animal population. From each selected cluster 15 dairy farmers were selected randomly. Thus, from eight KVK jurisdiction areas 120

dairy farmers were selected from south Karnataka and 120 dairy farmers were selected from north Karnataka. Total 240 dairy farmers were selected randomly.

The data were collected through semi-structured interview schedule. Information on production and livelihood security parameters was collected and analyzed for estimating the costs, returns from milk production and contribution in livelihood security of farmers from crossbred cattle. The statistical significance of differences in production parameters were tested by using 'z' test with the help of SPSS software. Livelihood security is operationalized as contribution made by crossbred cattle in terms of income generation, nourishment to the family, nutrients to farm, employment generation, security during uncertainties and social status symbol. The index developed by Biradar *et al.* (2013) was used with required modifications as given below:

Contribution to the total household income: The net return was measured by collecting information on different production values of each cow and average values of each parameter were calculated.

Table 1. Socio-economic characteristics of dairy farmers of south and north Karnataka

Socio-economic characteristics	Category	South n=120	North n=120	P value
Age	Young	51	39	0.262
	Middle	52	59	
	Old	17	22	
Caste	General	69	76	0.642
	OBC	41	36	
	SC/ST	10	8	
Education	Illiterate (Nil)	4	10	0.163
	Primary (1-5)	16	21	
	Higher Primary (5-7)	19	20	
	High School (8-10)	39	33	
	Pre-University/ Diploma / ITI (11-12)	29	23	
	Graduation	9	13	
Family size	Post-Graduation	4	0	0.002
	Small	70	45	
	Medium	48	67	
Land Holding	Large	2	8	0.000
	Landless	0	9	
	Marginal	14	40	
	Small	40	30	
	Medium	64	37	
Occupation	Large	2	4	0.000
	Farming	115	83	
	Dairying	1	27	
	Farm Labour	3	10	
	Business	1	0	
Experience	Service	0	0	0.081
	Low	58	70	
	Medium	44	42	
Income	High	18	8	0.347
	Low	89	98	
	Medium	20	13	
	High	11	9	

Nourishment to the family: Based on the daily average milk consumed by the family, the nutrients were computed in terms of protein, fat and calcium as suggested by Gopalan *et al.* (1971).

Nutrients to the farm: The average farm yard manure applied to their respective farm was converted in terms of N, P and K by following the conversion factors suggested by Gautam (2007), that is, one tonne of farm yard manure was equivalent to 8 Kg N, 4 Kg P₂O₅ and 16 Kg K₂O.

Employment generation: Number of hours engaged in crossbred cattle rearing for one year was collected. Total hours spent in a year were divided by 8 hours to convert them in to man-days. Total number of man-days contributed was expressed as mean values.

Security during uncertainties: Number of households having used crossbred cattle to face the uncertainties in the past two years.

Status symbol: The number of households who regard keeping crossbred cattle as symbol of social status.

Results and discussion

Socio-economic characteristics

To ascertain socio-economic characteristics of the dairy farmers of south and north Karnataka, data on age, caste, education, family size, landholding, experience, and income were collected and the frequency of various socio-economic characteristics was calculated. As per the data given in Table 1, majority of dairy farmers of both the categories belonged to middle age group and were from general caste. The majority of dairy farmers of both the categories were having high school level of education followed by pre-university. There were primary educated and also graduates, although few in numbers. Majority of dairy farmers were having medium to small family size as well as medium to small land holding. The annual income of majority cattle owners was low as well as majority farmers had low level of experience in dairy farming. Chi-square test was used to test the association between farmers of two categories and socio-economic characteristics. It was found that farmer categories were significantly ($p < 0.05$) associated with socio-economic characteristics such as family size, land holding and occupation. It signifies the importance of labour and fodder production for rearing of dairy animals. Similar results were reported in Andhra Pradesh (Sikhakolanu, 2007)

Crossbred cattle production

From the Table 2, it is clear that the dairy farmers had more number of milking crossbred cattle (2.08) in south Karnataka as compared to north (1.96). Average quantity of dry and green fodder fed per animal in case of south Karnataka was more (6.88 and 18.90 kg, respectively) as compared to north Karnataka (6.70 and 17.99 kg respectively). But, average quantity of concentrates fed per animal in case of south Karnataka was less (3.49 kg) as compared to north (4.03 kg). Thus, total feed cost and expenditure per animal was more in case of north Karnataka (₹ 116.83 and 161.92, respectively) than south (₹ 111.86 and 156.93 respectively). South Karnataka dairy animals were producing more milk (9.64 L/anim./day) as compared to

Production status of cross breed cattle and contribution

Table 2. Production parameters of crossbred cattle perceived by dairy farmers

Parameter	South n = 120		North n = 120		P value
	Mean	SD	Mean	SD	
Total milking animals (no.)	2.08	1.00	1.96	1.33	0.410
Total milk production (L/day)	20.09	11.23	18.70	14.39	0.405
Total milk production (L/anim./day)	9.64	1.69	9.48	1.99	0.507
Total dry fodder fed (kg/anim./day)	6.88	1.10	6.70	1.16	0.233
Total daily green fodder fed (kg/anim./day)	18.90	3.43	17.99	4.36	0.074
Total concentrate fed (kg/anim./day)	3.49	1.17	4.03	1.07	0.000
Total feed cost (₹/anim.)	111.86	18.19	116.83	15.93	0.025
Labour cost (₹/anim./day)	40.00	0.00	40.00	0.00	NA
Health cost (₹/anim./day)	5.00	0.00	5.00	0.00	NA
Total expenditure (₹/anim./day)	156.93	18.15	161.92	15.91	0.024
Net return/anim. (₹/day)	111.73	50.43	103.34	61.21	0.248
Milk nourishment to the family (L/day)	1.59	0.57	1.63	0.56	0.571
Employment generation (hrs/day/anim.)	2.38	1.01	2.29	1.05	0.490
Dung production (Kg/day/anim.)	23.24	1.95	23.14	1.81	0.681
Without considering cost of fodder					
Total feed cost (₹/anim./day)	56.08	17.03	63.09	16.39	0.001
Total expenditure (₹/anim./day)	101.08	17.03	108.09	16.39	0.001
Net return/anim. (₹/day)	167.51	50.34	157.08	60.90	0.149

north (9.48 L/day). Dairy animals required less expenditure on health per day/anim. (₹ 5) but the net return/day per animal (₹ 111.73) was more in case of south Karnataka as compared to north (₹ 103.34). Net return/day per litre (₹ 11.09) and per farm (₹ 236.186) was more in south Karnataka as compared to north (₹ 9.83 and 210.13, resp.). This was because of more productivity of dairy animals, more awareness, less resource constraints including availability of good quality fodder and grazing lands due to high rainfall in south Karnataka as compared to north Karnataka.

Majority of the cattle owners used own farm grown dry and green fodder to feed their cattle or from grazing. Without considering cost of fodder as shown in Table 2, total feed cost (₹/anim./day) was less in case of south (56.08) as compared to

north (63.09). Thus, total expenditure (₹/anim./day) was less in case of south (101.08) as compared to north (108.09) but net return/day per animal (₹ 167.51) and per farm (₹ 352.46) was more in south Karnataka as compared to north (₹ 157.08 and 313.42, resp.). Dung produced (23.14 to 23.24 Kg/day/animal) was used as manure in own farm. Consumption of milk provided nourishment to family (1.59 and 1.63 L/day in case of south & north). Similar results were reported in western Maharashtra and Karnataka (Kolekar *et al.*, 2015 and 2023, respectively). The 'z' test was used to test the difference between the production parameters perceived for crossbred cattle of south and north. Analysis showed that there was a significant difference for production parameters such as concentrate fed, feed cost and total expenditure of two regions.

Contribution of crossbred cattle to the farmer's livelihood

Contribution of crossbred cattle to the farmer's livelihood is presented in Table 3. net return/day per animal (₹ 167.51) and per farm (₹ 352.46) was more in south Karnataka as compared to north (₹ 157.08 and 313.42, respectively). As majority of the cattle owners used own farm grown dry and green fodder to feed their cattle or from grazing. Without considering the cost of fodder also, net return/day per animal (₹ 167.51) and per farm (₹ 352.46) was more in south Karnataka as compared to north (₹ 157.08 and 313.42, respectively). Protein, fat and calcium nourishment per animal to the family gm/day was almost similar in case of south Karnataka (50.88, 65.19 and 1908, respectively) with that of north (52.16, 66.83 and 1956, respectively). Nutrients to farm *i.e.* NPK kg/year/animal was also almost similar in case of south Karnataka (67.86, 33.93 and 135.72, respectively) with that of north (67.57, 33.78 and 135.14, respectively). Employment generation (Man days/year) per animal was more in case of south Karnataka (108.59) as compared to north (104.48) as both areas have similar labour requirements for dairy animals. Similar results were reported in western Maharashtra and Karnataka (Kolekar *et al.*, 2015 and 2023, respectively). The 'z' test was used to test the difference between the types

Table 3. Contribution of crossbred cattle to the farmers livelihood

Type of contribution	Unit	Values		P Value
		South = 120	North = 120	
Income from cows	Net return/anim./day (₹)	111.73	103.34	0.248
	Net return/farm/day (₹)	236.19	210.13	0.306
	Net return/L(₹)	11.09	9.83	0.057
Income from cows (Without considering cost of fodder)	Net return/anim./day (₹)	167.51	157.08	0.149
	Net return/farm/day (₹)	352.46	313.42	0.223
	Net return/L(₹)	17.10	15.84	0.010
Nourishment to the Family	Protein (gm/day/family)	50.88	52.16	0.571
	Fat (gm/day/family)	65.19	66.83	0.571
	Calcium (mg/day/family)	1908	1956	0.571
Nutrients to the Farm	N kg/year	67.86	67.57	0.681
	P kg/year	33.93	33.78	0.681
	K kg/year	135.72	135.14	0.681
Generating Employment	Man days/year	108.59	104.48	0.490

of contribution perceived by farm households in case of south and north. Analysis showed that there was not a significant difference between majority types of contribution of dairy animals of south and north Karnataka.

Conclusion

The significant differences in milk production parameters and components of livelihood security in case of south and north

Karnataka farmers were due to efficient and scientific nutritional and health management practices in case of south Karnataka. The potential to enhance the productivity of the dairy animals through professional farm management and superior nutrition is immense. Dairy animal's productivity can be improved with organized breeding programs, better management practices, need based capacity building programmes to hasten the efficiency of milk production and livelihood security of resource poor farmers.

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