Original Research

An Economic Analysis on Factors Influencing the Family Income of Livestock Farmers: A North-Eastern Karnataka Study

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Abstract

Livestock is an integral part of farming in the agricultural scenario of the country as well as the state. Since ancient times, cattle and buffaloes are maintained to meet the daily requirements of milk, draught power, field operation and for valuable organic manure. Sheep, goats, poultry and pigs are used to extract the meat, which is the major source of animal protein in the country. Multiple regression function was fitted and regression coefficients of various factors influencing the total family income of livestock farmers were identified. Among different explanatory variables, per cent share of dairy income to total income (326.09), per cent area under irrigation (473.26) and number of milch animals (17027.92) were significantly influencing the total income of the livestock farmers. Whereas, total dairy expenditure was negatively significant. Livestock provides major source of income to the landless labourers, marginal and small farmers to sustain their family income in the area of study.

Key words: Family Income, Livestock Based Income, Multiple Regression Function, North-Eastern Karnataka, Off-Farm Enterprise

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Introduction

Livestock was revealed with multi-faceted contribution to socio-economic development of rural masses. Due to the inelastic absorptive capacity for labour in other economic sectors, livestock sector has greater scope for generating more employment opportunities, especially for the marginal and small farmers and landless labourers who own around 70 per cent of the country's livestock. On the other hand, livestock wealth was more equitably distributed than that of land (Anjani Kumar and Singh, 2011). Being an

important source of income and employment, the livestock also helps in alleviating poverty and smoothening of income distribution (Birthal *et al*., 2012).

Globally, the livestock wealth comprises of 298.2 million of buffaloes, 995.7 million of cattle, 1520.6 million of goats, 2605.2 million of sheep, 128.5 million of horses, 108.5 million of donkeys and 93.9 million of camels (FAOSTAT, 2016). The distribution of livestock population across the globe showed that ruminants, cattle and sheep dominated in Asia, Africa and Oceania, while the proportion of cattle, sheep and goat population was almost same in Europe (Prakash *et al.*, 2012). India supports approximately 22 per cent of world's human and 16 per cent of livestock population on 2.9 per cent of its geographical area where livestock has emerged as a driving force in the growth of agricultural sector. Further, this sector accounts for a GDP of 2681 billion contributing 4.87 per cent to the total GDP and 21.84 per cent to the agricultural GDP (CSO, 2017). However, the growth rate of total GDP during 2015-16 was 2.1 per cent and 3.9 per cent in terms of value of output for livestock sector.

According to the 19th livestock census (2012), the livestock population in Karnataka was 9.51 million of cattle, 3.47 million of buffaloes, 9.58 million of sheep, 4.79 million of goats, 1.21 million of pigs and 32 million of poultry respectively. The dominant species of livestock in the state includes buffalo, cattle, goat, sheep and poultry (GOK, 2017). The state ranks 17th in total livestock population and 14th in poultry population in India. Besides, it accounts for roughly 2.89 per cent of total livestock population and 3.51 per cent of poultry population in the country (GOI, 2017). In North-eastern Karnataka (NEK) region, the population of total livestock increased from 4.89 million in 1982 to 6.59 million in 2012. Among livestock, cattle population was2.01 million, 0.79 million of buffaloes, 2.23 million of sheep and 1.56 million of goats, respectively (livestock census, 2012). In the NEK region ownership of the livestock was unevenly distributed and considerable regional diversity was observed in livestock productivity as well as in stocking rates of species. In this region, livestock rearing has all along been an indispensable, complementary activity to agriculture.

Livestock provides major source of income to the landless labourers, marginal and small farmers to sustain their family income (Balishter and Singh, 2003). It constantly generates income and employment throughout the year for majority of the farmers. The extent of dependency on livestock is more in landless labourers and marginal farmers (Jabir, 2007). Therefore, the research study was focused to assess the factors influencing family income of livestock farmers in North-Eastern Karnataka region.

Material and Method

The present investigation was carried out during 2017, wherein the multistage random sampling technique was adopted for the selection of sample farmers. In the first stage, three districts namely Kalaburagi, Bidar and Raichur were selected based on the highest number of livestock population (cattle, buffalo, sheep and

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goat). In the second stage, two talukas from each district were selected based on potentiality and highest number of cattle, buffalo, sheep and goat population. In the third stage, four villages from each selected taluk *i.e.* a total of twenty four sample villages were randomly selected from the six talukas and in turn ten sample respondents from each village were selected, which constituted 240 sample respondents for the study as a whole. The data was collected using pre-structured and pre- tested schedules. The data pertains to pattern of livestock holding across different category of farmers and availability of livestock resources such as feed, fodder, labour, veterinary care, composition of livestock and inputs used for livestock etc.

Statistical Method

The multiple linear regression function was chosen because it has high R^2 value than other forms of the function, and it was best fit to the data. To assess the relationship between total incomes of the household farmers and selected explanatory variables, the multiple linear regression function of the form-

$$Y=a+b_1X_1+b_2X_2+b_3X_3+b_4X_4+b_5X_5+b_6X_6+b_7X_7+b_8X_8$$

was employed to analyse the data of the sample farmers. Where,

Y = Total income of the farmer household X_1= Size of land holdings
X_2= Total cost of cultivation
X_3= per cent share of dairy income to total income X_4= per cent area under irrigation
X_5= per cent share of commercial crop income to total crop income X_6= No. of people employed in off-farm activities
X_7= Total dairy expenditure X_8= Number of milch animals a= intercept
b_i= the regression coefficients

Results and Discussion

Livestock Income

The gross returns from livestock is shown in Table 1. The farmers produced crossbred and local cow milk with an average quantity of 10882 and 3312 litres per annum, respectively. Whereas, the crossbred and local buffalo milk was produced with an average quantity of 7922 and 1840 litres per annum respectively. The farmers sold 9675 litres of crossbred cow milk and 3030 litres of local cow milk. Further, they sold 6852 litres and 1490 litres of crossbred and local buffalo milk per annum respectively. Farmers consumed an average of 1207 litres of crossbred and 282 litres of local cow milk followed by 1070 litres of crossbred and 350 litres of local buffalo milk respectively. Marketed surplus for crossbred and local cow milk were 88 and 90 per cent respectively. Further the marketed surplus for crossbred and local buffalo milk was 84 and 80 percent respectively. The share of gross returns from milk was higher when compared to other livestock products across all categories of farmers.

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Table 1: Gross income derived from livestock (Per farm) (Value in Rs)

Categories	Produced				Sale												Marketed surplus (%)			
	Cow milk		Buffalo milk		Cow milk				Buffalo milk				Young stock		Sheep	Goats	Cow milk		Buffalo milk	
	CB	local	CB	local	CB		local		CB		local		Cow	Buffalo			CB	local	CB	local
	Qty. (lit)	Qty. (lit)	Qty. (lit)	Qty. (lit)	Qty. (lit)	Value	Qty. (lit)	Value	Qty. (lit)	Value	Qty. (lit)	Value	Value	Value	Value	Value				
Landless	9166	1600	5150	1100	8800	95500	1450	14420	4010	42050	950	9080	460	350	25000	21000	95	90	77	86
Marginal	10880	2650	7900	1450	8100	99800	2050	24060	6500	66300	1010	12050	520	410	35500	32000	74	77	82	69
Small	11352	3800	8500	2010	10500	120600	3700	35000	7400	75850	1500	18560	600	490	42500	38000	92	97	87	74
Large	12130	5200	10140	2800	11300	157000	4920	52650	9500	99890	2500	24000	800	540	59300	48000	93	94	93	89
Total	10882	3312	7922	1840	9675	114975	3030	31532	6852	71022	1490	15922	595	447	40575	34750	88	90	84	80
No. of farmers	179	125	76	46	-	179	-	125	-	76	-	46	62	33	80	110	-	-	-	-
Per cent of farmers	74.58	52.08	31.66	19.16	-	74.58	-	58.08		31.66	-	19.16	25.83	13.75	33.33	45.83	-	-	-	-

Qty. : indicate quantity ; lit : litres ; CB: Crossbred

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Large farmers received annually Rs.1,57,000 from crossbred and Rs.52,650 from local cow milk, while it was Rs.1,20,600 and Rs.35,000 for small farmers respectively. With respect to marginal farmers and landless labourers it was Rs.99,800 and Rs.95,500 from crossbred while Rs.24,060 and Rs.14,420 from local cow milk respectively. Regarding sale of buffalo milk by the framers, it was the highest for large farmers who received annually Rs.99,890 from crossbred and Rs.24,000 from local buffalo respectively, while it was Rs.75,850 and Rs.18,560 respectively for small farmers. With respect to marginal farmers and landless labourers, they received Rs.66,300 and Rs.42,050 from crossbred and Rs.12,050 and Rs.9,080 from local cow milk respectively. Among small ruminants, income from sheep and goat was Rs.40,575 and Rs.34,750respectively. The gross return was highest in crossbred cow milk; hence all farmers reared the crossbred cows for milk purpose and the farmers mainly depend on dairy in order to sustain their family income. But the income produced from crossbred cow milk was higher than buffalo milk, due to the higher milk yield in crossbred cows (15-20 litres per day) as compared to buffaloes (5-7 litres per day). The similar findings were reported by Reddy *et al.* (2005) and Pandey and Kumar (2000).

Off-Farm Income

Information on income received from off-farm source is given in Table 2. The table indicated that 36 (15.00%) males and 29 (12.08%) females were earning average annual income of Rs.1,98,000 and Rs.1,21,800 respectively from off-farm source. The off-farm sources were teaching, petty shop, carpentry, construction activity, wine shop *etc*.

Table 2: Income from off-farm enterprise activities per annum of the sample farmers

S. No.	Gender	No. of farmers	Average Income (Rs.)
1	Male (No.)	36 (15.00)	1,98,000
2	Female (No.)	29 (12.08)	1,21,800
3	Total sample farm families	240	

Figures in parentheses indicate percentage to the total farmers

Income from Wages

The income earned by landless and marginal farmers from the wages is shown in Table 3. The income earned by men was highest compared to women. Whereas, 12 men in all landless labour category were earning average wage income of Rs.46,850 per annum and it was Rs.35,500 for marginal farmers, respectively. In the case of women, it was the highest for landless labourers *i.e.*, Rs.34,280 followed by marginal farmers with Rs.12,500, respectively per annum.

Among landless and marginal farmers, the men earned more income per year from wages than to small farmers, it was due to number of man days were more in landless and marginal farmers. In case of women, the landless labourers earned more income than marginal farmers. Thus, the women in these families worked as labourers along with maintaining livestock animals. But, people with zero initial capital, land,

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talents and opportunities in off-farm income have to earn money through hiring out of their manual labour. These findings were in line with the findings of Rao and Sambashiva (2005).

Table 3: Income from wages of the sample farmers

Gender	Particulars	Landless (n_1=48)	Marginal (n_2=55)	Total
Men	No. of men	12	7	19
	Families (No.)	11 (22.91)	5 (9.09)	16 (6.66)
	Av. Income Rs. /year	46,850	35,500	41,175
Women	No. of women	10	3	13
	Families (No.)	8 (16.66)	2 (3.63)	10 (4.16)
	Av. Income Rs. /year	34,280	12,500	23,390

Figures in parentheses indicate percentage to the total farmers; Wage rate for men= Rs.300/day; Wage rate for women=Rs.250/day

Composition of Annual Net Income from Different Enterprises of Farm Family

The total income from dairy enterprise was earned by large and small farmers with relatively higher than landless labourers and marginal farmers, which might be due to the large and small farmers had maintained more number of crossbred cows than landless labourers and marginal farmers. Further, farmers received an average income of Rs. 2,05,300 from dairy, which indicated that all farmers were dependent on livestock to sustain their family income and provided a substantial contribution to the family earnings.

Table 4: Net income realized from different enterprises of the sample farmers (per year per farm) (n=240)

S. No.	Enterprise	Landless (n_1=48)		Marginal (n_2=55)		Small (n_3=60)		Large (n_4=77)		Pooled	
		No. of farmers	Income (Rs.)	No. of farmers	Income (Rs.)	No. of farmers	Income (Rs.)	No. of farmers	Income (Rs.)	No. of farmers	Income (Rs.)
1	Wages	22 (25.00)	48,400	10 (12.72)	28,000	0	0	0	0	32 (13.33)	35,500
2	Off farm	10 (20.84)	19,250	11 (20.00)	21,540	13 (21.67)	23,500	31 (40.26)	45,800	65 (27.08)	29,680
3	Dairy	26 (54.16)	1,75,500	20 (36.36)	1,95,500	23 (38.33)	2,26,300	24 (31.16)	2,59,500	93 (38.75)	2,05,300
4	Other livestock	36 (75.00)	15,000	25 (45.45)	21,000	32 (53.33)	32,500	30 (38.96)	40,800	123 (51.25)	25,325
5	Crops	0	0	19 (34.55)	35,315	29 (48.33)	80,600	36 (46.75)	1,12,500	84 (35.00)	68,650
6	**Total income**	-	**2,58,150**	-	**3,01,355**	-	**3,62,900**	-	**4,58,600**	-	**3,45,700**

Figures in parentheses indicate percentage to the total farmers

However, off-farm activities and crops contributed higher income to the sample farmers in the study area, but prices of these enterprises had widely fluctuated and lack of guarantee in receiving same income throughout the year. While, the price of milk does not fluctuate and thus, farmers received relatively stable and regular income from the dairy. On the other hand, the off-farm activity was contributed highest income

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to 31 (40.26%) large farmers, in which they earned Rs. 45,800 per annum from teaching profession, *etc*. The findings of the present study are in conformity with the findings of Jabir (2007) and Ghulam *et al.* (2009).

Family Income Function

Multiple regression function was fitted and the regression coefficients of various factors influencing total family income of livestock farmers are presented in Table 5. Among different explanatory variables, per cent share of dairy income to total income (326.09), per cent area under irrigation (473.26), total dairy expenditure (-0.98) and number of milch animals (17027) were significantly influencing total income of livestock farmers. Whereas, total dairy expenditure was negatively significant. Land holdings, total cost of cultivation, per cent share of commercial crops to total crop income and number of people working outside the farm did not have any significant effect. The R^2 value of 0.66 indicated goodness of fit.

It was observed that the increase in one per cent area under irrigation and one milch animal, significantly increased total family income of farmers up to Rs. 473 and Rs. 17,021, respectively. This could be due to large farmers cultivated the vegetables under irrigation condition. While, the returns from vegetables were higher than all other crops. Further, the per cent share of dairy to total income showed positive influence on total income, which might be due to the magnitude and importance to dairy by the large farmers was less than that of landless and marginal farmers. On the other hand, income from livestock was an important source of earning for landless and marginal farmer's categories. Similar results were obtained by Sharma and Singh (2011). An increase in income of large farmers was not due to dairy, but due to increase in income from vegetables.

Table 5: Factors influencing the total family income of the sample farmers

S. No.	Variable	Coefficient
1	Intercept	32903.05 (10435.74)
2	Land holdings	2736.32 (1646.45)
3	Total cost of cultivation	0.75 (0.59)
4	% share of dairy income to total income	326.09* (153.46)
5	% area under irrigation	473.26* (223.81)
6	% share of commercial crop income to total crop income	108.28 (143.96)
7	No. of people working outside the farm	1984.69 (3087.72)
8	Total dairy expenditure	-0.98* (0.43)
9	Number of milch animals	17027.92* (7301.94)
10	Adjusted R^2	0.61
11	R^2	0.66

*Figure in parentheses indicate the standard error; * Significant at 5% level*

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Conclusion

Livestock sector plays a prominent role in the rural economy in supplementing the income of rural households, particularly the landless labourers, small and marginal farmers. It also provides subsidiary occupation in semi-urban areas and more so for people living in hilly, tribal and drought prone areas where crop output may not sustain the family. Livestock has been recognized as an important approach for sustained livelihood. Further, the livestock is an important source of income and employment in rural sector.In addition, it helps to meet the equity task in rural development through their contribution to the cash income for small and marginal farmers and landless labourers. Thus, results of the study clearly shows the factors influencing family income of livestock farmers.

Conflict of Interest Statement

All the authors of the original research paper declare that there has no conflict of interest.

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