J. Res. ANGRAU 50 (2) 147-153, 2022

ANALYSIS OF EMPLOYMENT AND INCOME GENERATION THROUGH DAIRY FARMING IN RURAL PUNJAB

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Date of Receipt : 26.3.2022 Date of Acceptance : 02.5.2022

ABSTRACT

Analysis of employment and income generation from dairying in rural Punjab, the study revealed that dairy farming generated, on an average, employment of 193 person days per annum in the rural areas of Punjab. Out of this, male employees were higher than female employees. The average annual income of households involved in dairying was ¹ 494289 per household from all sources, from which, the income from dairying constituted around one-fifth of the total income of the dairy farmers. The value of the Gini Coefficient exclusive of dairy income was higher than the value of the Gini Coefficient when dairy income included in total family income, thereby implying that dairying improved the income distribution by reducing income inequalities. The results of the t-test revealed that dairy income helped in sustaining the livelihood of dairy farmers, improved their income distribution, and hence, helped in raising the standard of living of milk producers.

Keywords: Dairy Farming, Employment, Gini Coefficient, Income Generation, Inequalities

INTRODUCTION

Dairy farming has been considered as a crucial value-added farming system practiced in India. Dairy farming is a major source of employment and income generation in rural areas. Dairying has provided livelihood to millions of resource poor farmers. Dairying is considered an effective instrument in bringing socio-economic transformation. Operation flood is one of India's highly successful rural developmental programmes. It is a smallholder dairy production initiative that, further, has laid the foundation for the dairy cooperative movement in India (Toor and Kaur, 2021). The importance of dairying hardly needs accentuation. The dairy sector contributed around 4 percent of the total Gross Domestic Product (GDP) at constant prices and a large share of 26 percent of the agricultural GDP at constant prices in India in 2015-16 (Lal and Chandel, 2016). The livestock population in Punjab was 8117.10 thousand in 2012. Out of this, buffalo population was 5159.73 thousand and cattle population was 2427.71 thousand in 2012. The milk production was 13347 thousand tonnes in Punjab in 2019-2020 (GoP, 2020).

Quddus and Islam (2008) found that the exotic cows had shown higher gross income than the local cows. Khan and Parashari (2014) found

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that a major proportion of the population was engaged in different dairy activities in Moradabad district of Uttar Pradesh. Jaiswal *et al*. (2018) revealed that dairying had positively and significantly contributed to the income and employment of rural households. In this study, efforts were made to work out employment and income generation from dairying in rural Punjab and to test the hypothesis stating that dairying has helped in the upliftment of standards of living of the milk producers.

MATERIAL AND METHODS

The data collection for this study was done in 2019. The study was based on primary data, collected through a detailed schedule from 420 dairy farmers belonging to different farm size categories, viz. large farmers (who owns 15 acres land or more), medium farmers (who own land in the range of 5-15 acres), small farmers (who own land in the range of 2.5-5 acres), marginal farmers (who own land up to 2.5 acres) and landless households (who do not own any land), from 21 villages situated in three different agro-climatic zones (Shivalik-Foothills, Central Plains, and South-West Dry zones) of Punjab state. A multi-stage sampling technique was used to select the villages and dairy farmers in the study area.

DATA ANALYSIS

Descriptive statistical tools such as mean values and proportions were used while carrying out the tabular analysis. Gini Coefficient and t-tests were also used to support the findings. Gini coefficient is a measure of statistical dispersion intended to represent the income inequality within a nation or a social group. The value of Gini Coefficient lies between 0 and 1. A Gini Coefficient of zero represents the perfect equality and Gini Coefficient of 1 expresses the maximal inequality. If xi the income of person *i,* and there are *n* persons, then the Gini Coefficient is given by:

$$G = \frac{\sum_{i=1}^{n} \sum_{j=1}^{n} \left| x_i - x_j \right|}{2n \sum_{j=1}^{n} x_j}$$

RESULTS AND DISCUSSION

Number of labourers employed in dairying

In dairying, there is a need for three main resources, *i.e.* land, labour and capital. Labour cost is the major component of the variable cost involved in dairying. Labour requirement depends upon the herd size, feeding practices and also on the degree of mechanisation. The labour can be family labour or hired labour. It is noticed in the study area that hired labour is also engaged in agriculture along with dairying.

Table 1 showed the distribution of dairy farmers based on labour hired for dairying. Only 77 (18.33 percent) dairy farm households (out of 420) were hiring labour for dairying. Out of these, 23 (29.87 percent) were permanent, managing dairying as well as agriculture, and 54 (70.13 percent) were casual labour to do temporary chores involved in agriculture and dairying.

The highest number (21) of the permanent labourers were found in the large farm size category and none of the dairy farm households from the marginal and landless households made use of hired labour permanently. The maximum number (29, 58 percent) of the casual labourers was among the large farm size category and none of the same belonged to landless households.

There was no use of hired labour among the landless households as most of the dairying activities were performed by themselves.

Human labour employment generated (person days per milch animal per annum)

Dairy farming involved millions of resource-poor farmers, for whom animal ownership ensured critical livelihood and economic stability. However, the role of dairying in rural income and employment is generally overlooked. The total use of family and hired labour for performing different dairy activities were considered human labour employment in dairying. Table 2 provided information about human labour employment in dairying, calculated based on person days per milch animal per annum. The study of Chhabra *et al.* (2016) revealed that dairying generated employment of 101 days per milch animal per annum among the members of dairy cooperatives in South-Western Punjab. On average, dairying generated employment for 193 person days per annum. However, the study of Dhawan and Kashish (2016) revealed that dairying employed 257 person days during 2000-03. The share of family labour was 130 person days per annum and that of hired labour was 63 person days per annum. The male labour employment in dairying was 144 person days per annum and female participation was 49 person days per annum. Female employment was higher (43 person days per annum) for family labour than hired labour (6 person days per annum). The female labour employment was lower as compared to male labour employment as most of the females performed milking of dairy animals and cleaning shed. All other dairy activities such as a collection of fodder, chaffing of fodder and milk marketing were performed by males.

Among the categories, the highest (223 person days per annum) generated employment was for medium farm size category, followed by 195 person days per annum for the marginal farm size category, 188 person days per annum for small farm size category, 154 person days per annum for large farm size category and 150 person days for landless households.

Sources of annual income of dairy farm households

Income is an important factor in maintaining the survival of the family. Dairy farmers had different sources of income, *viz.,* farm income, income from dairying, wages, pension, remittances, etc. Table 3 provides information regarding different sources of annual income among dairy farmers. The annual income per household among sampled farmers was ₹ 494289. As far as sources of income were concerned, dairy farmers got major income (₹ 244247, 49.4 percent) from agriculture, followed by ₹89360 (18.08 percent) from dairying, ₹ 86195 (17.44 percent) from other sources (such as employment in the public sector and private sector jobs and family-run business), ₹ 31806 (6.43 percent) from remittances, ₹ 28701 (5.81 percent) from wages and ₹ 13981 (2.83 percent) from the pension. Similar findings were reported by Nedelea *et al*. (2009), in which dairy farming was the second major income-generating activity of poor people. The highest (₹ 147864) income from dairying was received by the large farm size category as they had higher and good quality herd size and the lowest (₹ 54822) of the same was found among landless households as they failed to feed their dairy animals according to their dry matter requirement, resulting in poor performance of their dairy animals.

Impact of dairying on income distribution

Income distribution is a crucial indicator of socio-economic development. The income disparities lead to socio-economic imbalances. The disparities in income are captured by Gini Coefficient. Gini coefficient is used to measure

the concentration of income among households. The value of the Gini coefficient lies between 0 and 1. The higher the value of the Gini Coefficient, the higher is the income inequality and vice-versa. Table 4 shows the results for the Gini Coefficient, inclusive and exclusive of dairy income. The value of the Gini Coefficient was 0.43 inclusive of dairy income and it rose to 0.48 when dairy income was excluded from family income in rural Punjab. This implied that dairying helped in improving income distribution by reducing income inequality. The results are in line with the findings of Kashish *et al.* (2017) who reported that dairying has improved the income distribution of the dairy farmers. Across the categories, the Gini Coefficient varied from 0.23 to 0.38 in case of inclusive of dairy income whereas it ranged from 0.25 to 0.45 in case of exclusive of dairy income. This meant that dairying helped in sustaining the livelihood of milk producers and reduced income inequality among them. The same was the case with other household categories as the value of the Gini Coefficient was lower when dairy income was included than exclusion of dairy income.

Testing of hypothesis

H0: Dairy farming has no impact upon the upliftment of standard of living of milk producers.

H1: Dairy farming has a positive impact upon the upliftment of standard of living of milk producers.

To prove this hypothesis, income was used as a proxy variable for the standard of living of milk producers. The t-test was used to compare the average family income of inclusive and exclusive of dairy income (Table 5). One tail t-test was used as an alternate hypothesis that aimed to test the only positive impact of dairying on the standard of living of milk producers. The calculated value of t (3.14) was greater than the critical value of t (1.65). This led to the rejection of the null hypothesis. It implied that there was a significant difference in family income, inclusive and exclusive of dairy income. This difference could not be attributed to the fluctuations in data. The analysis revealed that the dairy income helped in sustaining the livelihood of dairy

Table 1. Number of hired labourers employed in dairying (n=420)

S. No.	Category	No. of hired labourers employed in dairying				
		Permanent		Casual		Total
		No.	%	No.	%	
1.	Large farm Househ.	21	42.00	29	58.00	50
2.	Medium farm Househ.	1	8.33	11	91.67	12
3.	Small farm Househ.	1	9.09	10	90.91	11
4.	Marginal farm Househ.	0	0.00	4	100.00	4
5.	Landless Househ.	0	0.00	0	0.00	0
6.	Sampled	23	29.87	54	70.13	77

Source: Field Survey, 2019; **Note:** Househ. is abbreviation used for Households

Table 2. Human labour employment (person days per milch animal per annum) (n=420)

S. No.	H Category	uman Labour Employment (person days per milch animal per annum)								
		Family Labour			Hired Labour			Total Labour		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
1.	Large farm Househ.	81	7	88	63	4	67	144	11	154
2.	Medium farm Househ.	103	30	133	82	8	90	185	38	223
3.	Small farm Househ.	95	42	138	37	14	51	133	56	188
4.	Marginal farm Househ.	91	76	167	29	0	29	119	76	195
5.	Landless Househ.	64	86	150	0	0	0	64	86	150
6.		87	43	130	57	6	63	144	49	193
	Sampled	(66.92)	(33.08)	(100)	(90.47)	(9.53)	(100)	(74.61)	(25.39)	(100)
		(44.98)	(55.02)	(100)	(76.82)	(23.18)	(100)	(53.96)	(46.04)	(100)

Source: Field Survey, 2019; Note: Figures in parentheses indicate percentage to the total sample

Table 3. Sources of annual income of dairy farm households (n=420)

S. No.	Category	Sources of Annual Income of Dairy Farm Households												
		Agriculture		Dairying		Labour		Pension		Remittances		Any other		
		Value	%	Value	%	Value	%	Value	%	Value	%	Value	%	Total
1.	Large farm Househ.	743719	71.54	147864	14.22	0	0.00	16714	1.61	19286	1.86	112000	10.77	1039583
2.	Medium farm Househ.	295986	52.16	89171	15.72	0	0.00	28679	5.06	41429	7.30	112142	19.76	567407
3.	Small farm Househ.	129364	34.26	85997	22.77	0	0.00	7571	2.00	45429	12.03	109286	28.94	377647
4.	Marginal farm Househ.	50307	19.81	68945	27.15	26329	10.37	8229	3.24	34314	13.50	65864	25.93	253988
5.	Landless Househ.	1857	0.80	54822	23.55	117174	50.33	8715	3.74	18571	7.98	31683	13.60	232822
6.	Sampled	244247	49.41	89360	18.08	28701	5.81	13980	2.83	31806	6.43	86195	17.44	494289

Source: Field Survey, 2019

Table 4. Impact of Dairying on Income Distribution

Sr. No.	Category	Impact of Dairying on Income Distribution			
		Average Annual Family income (in ₹)		Gini Coefficient	
		Inclusive of dairy income	Exclusive of dairy income	Inclusive of dairy income	Exclusive of dairy income
1.	Large farm Househ.	1039583	891719	0.23	0.25
2.	Medium farm Househ.	567407	478236	0.29	0.34
3.	Small farm Househ.	377647	291650	0.38	0.45
4.	Marginal farm Househ.	253988	185043	0.37	0.45
5.	Landless Househ.	232822	178000	0.32	0.37
6.	Sampled	494289	404929	0.43	0.48

Source: Field Survey, 2019

Table 5. Results of t-test of comparing difference between means

Sr. No.	Average Annual Income inclusive of Dairy Income (in ₹ per household)	Average Annual Income exclusive of Dairy Income (in ₹ per household)	Standard Error	t	p-value	Critical t
1.	494289	404929	2855.43	3.14	0.0001*	1.65

*Statistically significance at 5 percent level of significance

farmers, improved their income distribution, and hence, helped in raising the standard of living of milk producers. The results are in line with the findings of Selvakumar and Ramaraj (2017) who reported that dairying helped in improving the socio-economic conditions of the milk producers in Salem district.

CONCLUSION

The study revealed that around 70 percent of the labourers employed by the dairy farmers were casual ones in Punjab, while around 30 percent of total labourers only employed by the dairy farmers were permanent labourers. There was no use of hired labour among the landless households as most of the dairying activities were performed by family members. Dairy farming generated, on an average, employment of 193 person days per annum in rural areas of Punjab in contrast to the earlier studies that revealed lesser person days per annum. Out of this, male employment (144 person days per annum) was

quite higher than female employment (49 person days per annum). The share of family labour was 130 person days per annum and that of hired labour was 63 person days per annum. The findings, however, are in contrast with earlier studies [Chhabra, *et al*. (2016)], which shown that the share of hired labour was higher than family labour in dairying.

The average annual income of dairy farmers was ₹ 494289 per household. The income from dairying constituted around one-fifth of the total income of the dairy farmers. The value of the Gini Coefficient exclusive of dairy income was 0.48. However, it reduced to 0.43 when dairy income was included in total family income. Similar findings had been reported by earlier studies, implying that dairying improved income distribution by reducing income inequalities. The results of the t-test revealed that dairy income helped in sustaining the livelihood of dairy farmers, improved their income distribution and hence, helped in raising the standard of living of milk producers.

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