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An Economic Analysis of Integrated Farming on Marginal and Small Farms in Punjab

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Abstract

The present study was undertaken to analyse the employment and income level of marginal and small farms in Punjab. The study was conducted in Ludhiana and Ferozpur districts of Punjab with sample size of 120 during 2018-19 period. The results of study showed that the total labour hours used for crop production were about 1020.36 per farm. The share of family labour and hired human labour were estimated at 34.01 and 65.99 per cent respectively. Out of total, 89.71 days per annum labour generated from dairy farming the share of family labour and hired human labour was at 97 per cent and 3 per cent respectively. The total variable costs from marginal farms were Rs.69208 and Rs.147736 per farm on small farms, whereas the gross return were Rs.173002 per farm on marginal farms and Rs.357645 per farm on small farms. The return over variable costs were Rs.103794 per farm on marginal farms and Rs.209909 per farm on small farms. The extent of cost incurred on dairy animals were Rs.60163 on marginal farms and Rs.73663 on small farms. The results showed that net income from dairy were Rs.34225 from marginal farms, whereas it was Rs.61038 on small farms. The obvious reason of more net return on small farms was large herd size than marginal farms. The results concluded that sustainability of marginal and small farms in agriculture may be big challenge in future, so an urgent need to frame new policies to generate income and employment in dairy and non-agriculture sector.

Keywords: Net income, Employment, Marginal farmers, Small farmers

JEL Classification: D23, J21,Q19

Introduction

Agriculture dominates the Indian economy to such an extent that a high proportion of working population in the country is engaged in agriculture production and agriculture activities like livestock, bee-keeping fisheries etc. Integration of crop and livestock production has been great role in Indian economy. Mixed farming systems, in which crops and animals are integrated on the same farm, covers 2.5 billion hectares of land globally (De Haan *et al,* 1997). Integrating livestock and crop production in agriculture means shifting from the traditional systems focused exclusively on livestock or crop to a new approach which sustainably combines both, within the comprehensive framework

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of the agriculture approach. Dairy farming in the country is dominated by small-livestock farms which contributes over 70 per cent in dairy production.

There is a declining trend of average size of holdings for all operational classes (small & marginal, medium and large) over the years and for all classes put together the average size of holding has come down to 1.15 hectares in 2010-11 from 2.82 hectares in 1970-71. Whereas, the average size of land holding further decreased to 1.08 hectares during 2015-16 (Mukherjee 2018). In Punjab wheat and paddy are grown as main crops in Rabi and Kharif seasons respectively. Out of total of 4.13 million hectares of net area sown, wheat and paddy grown on 3.5 and 3.06 million hectares area respectively. Further in last fifteen years, the production of cereals increased from 27.84 million tonnes during 2000-01 to 28.39 million tonnes during 2015-16. Whereas the production of cereals was 30.39 million tonnes during 2018-19 (ENVIS Centre, Punjab), while it decreases in pulses, oilseeds, vegetables and fruits, and the yield of wheat and paddy remain only 43.04 quintals per hectare and 57.57 quintals per hectare respectively. On the other hand, the total number of livestock population in Punjab was 8.12million and per capita availability of milk per day was 1032 gm during 2018. Whereas, the bovines population increased from 2.03 million in 2003 to 2.42 million during 2018 with milk production of 7.7 million tonnes during 2000-01 to 11.85 million tonnes during 2017-18 in Punjab (Anonymous 2018). The cooperative farming, diversification, contract farming etc. are viable proportion in future agriculture. An effort is going on in this direction since 1986, when first expert committee for diversification of agriculture was instituted, but significant results have not been achieved so far. If the small and marginal farmers are forced to sell their land, it will further depress their already deplorable economic situation. At the same time, in the absence of alternative employment opportunities, the pushing out of the small and marginal farmers out of agriculture will result in social chaos (Singh 2000).

Therefore, in the given circumstances the solution lies in making these small farm families economically viable by creating opportunities for off-farm income and increasing farm income by rationalizing the resource use and their use. It will also be desirable to encourage alternative farming systems encompassing the present production system along with different enterprises such as dairy-farming, vegetable growing, fruit cultivation, agro-forestry etc. for augmenting the income and labour employment of small and marginal farmers. The adoption of dairy enterprise raised the income levels and productive employment of the small farmers, marginal farmers and landless labourers to the tune of 35 to 40 per cent and 43 to 53 per cent respectively (Atibudhi 1995). It has also been conveyed that optimum combination of dairying along with the existing cereals-based production system has the potential to enhance the income of the small farmers (Kaur 2001). Hence the study was under taken to analyze the employment and income level of integration on marginal and small farmers in Punjab.

Data Sources and Methodology

The present study was conducted in the Punjab state during 2018-19. Multi-stage random sampling technique was followed to

Table 1: Labour employment in crop production by sampled farmers in Punjab, 2018-19 (Hours/Farm)

Particulars		Marginal		Small		Overall	
		Hours	%age	Hours	%age	Hours	%age
Family Labour	Male	183.3	38.71	352.24	22.47	267.77	26.24
	Female	28.26	5.97	117.33	7.49	72.79	7.14
	Children	2.59	0.55	10.31	0.66	6.45	0.63
Total family labour(A)		214.15	45.23	479.90	30.62	347.01	34.01
Hired Labour	Male	240.42	50.77	974.82	62.20	607.61	59.55
	Female	15.04	3.18	92.96	5.93	54.01	5.29
	Children	3.89	0.82	19.57	1.25	11.73	1.15
Total hired labour (B)		259.35	54.77	1087.35	69.38	673.35	65.99
Total human labour (A+B)		**473.50**	**100**	**1567.25**	**100**	**1020.36**	**100**

draw a representative sample. At first stage, Ludhiana and Ferozpur districts were selected, due to maximum numbers of livestock population in these districts. At second stage, two blocks from each selected district namely Raikot and Mangat from Ludhiana district and Mamdot and Ghalkhurad from Ferozpur district were selected at random. At third stage, two villages from each selected block were selected and hence total of eight villages were selected to carry out the study. A list of the farmers having less than or equal to five acres of operational holding was prepared for each selected village. The farmers were further categorized into marginal farmers having operational holding less than 2.5 acres and small farmers having 2.5-5 acres of operational holding. From the list of marginal and small farmers, a sample of 15 respondent constituting both marginal and small respondents from each selected village were selected by probability proportional to size sampling, making a total sample of 120 farmers.

Results and Discussion

Employment pattern of sampled farmers

The extent of human labour used for performing various farm operations per farm were calculated and presented in table 1. The results revealed that the total human labour used for crop production came out 1020.36 hours per. The magnitude of family labour and hired human labour was estimated to the tune of 347.01 and 673.35 hours which accounted for 34.01 and 65.99 per cent share to the total human labour employment, respectively. Males get more employment than female on overall basis. The magnitude of human labour employment was 474.50 and 1567.25 hours per farm on marginal and small farms respectively.

Out of the total human labour employment, the share of family and hired labour came out about 45.23 and 54.77 in case of marginal farms and 30.62 and 69.38 per cent in case of small farms. On the whole, the share of family labour to the total human labour was

Table 2: Labour employment in dairy farming for sampled farmers in Punjab, 2018-19
(Average days/farm/annum)

Particulars		Marginal		Small		Overall	
		Hours	%age	Hours	%age	Hours	%age
Family Labour	Male	33.15	39.70	38.64	40.28	35.89	40.01
	Female	43.32	51.88	46.78	48.76	45.05	50.21
	Children	6.21	7.43	5.95	6.20	6.08	6.78
Total family labour (A)		82.68	99.01	91.37	95.24	87.02	97.00
Hired Labour	Male	0.82	0.99	3.88	4.04	2.35	2.62
	Female	-	-	-	-	-	-
	Children	-	-	0.69	0.72	0.34	0.38
Total hired labour (B)		0.82	0.99	4.57	4.76	2.69	3.00
Total human labour (A+B)		**83.50**	**100**	**95.94**	**100**	**89.71**	**100**

higher among marginal farms than that of small farms in the study area. It also showed that the share of family males (38.71 %) get higher employment than family females (5.97 %) in case of marginal farmers. Same trends as in small farmers were 22.47 per cent and 7.49 per cent respectively.

The table 2 revealed that the total human labour generated from dairy farming came out 89.71 days per annum. On per farm basis, the magnitude of family labour and hired human labour was estimated to be 87.02 and 2.69 days which accounted for 97 and 3 per cent share to the total human labour employment, respectively. The magnitude of human labour employment was 83.50 and 96.94 days per annum on marginal and small farms. Out of the total human labour employment, the share of family and hired labour came out about 99.01 and 0.99 in case of marginal farms and 95.24 and 4.76 per cent in case of small farms. On the whole, the share of family labour to the total human labour was higher among marginal farms than that of small farms in the study area. Hired females were not employed in case of marginal and small farms.

On the basis of the crop-rotations followed by the sampled farmers, an overall cost and returns structure of crop production on per farm basis was worked out and presented in Table 3. On an overall farm situation, an expenditure was incurred as variable cost on major crops i.e. paddy and wheat crops were Rs. 42530 and Rs.29806 respectively.

The respective figures in the case of marginal with Rs. 25428 and Rs.18291 and Rs.59633 and Rs.41321 respectively. The gross income from paddy and wheat crops were Rs.101914 and Rs.93702 on overall per basis, respectively. The gross income from minor crops i.e. vegetables and basmati rice were Rs.29650 and Rs. 10029 respectively. After deducted the total variable costs the return over variable cost was calculated, its values on paddy and wheat were Rs. 58483 and Rs. 63924 respectively. Same as these values in case of small and marginal farms were Rs.80289 and Rs.88636, Rs.36678 and Rs.39212 respectively.

Table 3: Costs and returns structure of different crops of sampled farmers in Punjab, 2018-19 (Rs./farm)

Particulars		Total variable costs	Gross income	Return over variable costs
	Paddy	25428	62106	36678
	Wheat	18291	57503	39212
Marginal	Basmati Rice	2752	6544	3792
Farmers	Fodder	12756	28164	15408
	Vegetables	9981	18685	8704
	Overall	69208	173002	103794
	Paddy	59633	141722	80289
	Wheat	41321	129957	88636
Small	Basmati Rice	5480	13514	8034
Farmers	Fodder	16780	31137	14357
	Vegetables	24522	41315	18593
	Overall	147736	357645	209909
	Paddy	42530	101914	58483
	Wheat	29806	93730	63924
	Basmati Rice	4116	10029	5913
Overall	Fodder	14768	29650	14882
	Vegetables	17251	30001	13649
	Overall	108471	265324	156851

The results pertaining to costs and returns of milch animals presented in Table 4 indicates that the total operational cost varied considerably with farm size. It was Rs. 60163 per farm in the case of marginal farms and Rs. 73663 per farm in the case of small farms. The major components of variable cost are feed, green fodder and dry fodder. A balanced diet for animals mainly has two components i.e. roughage and concentrate mixture. The roughage part includes both dry roughages and green roughages. The dry roughages are poor in nutritive value and mainly provide bulk to the animals, while most of the nutrients are provided by concentrate mixture and green forages (GADVASU, 2018). The results show that per farm total cost spent on feed came to be Rs. 14632 on an overall farm situation which accounted 21.93 per cent share to the total variable cost.

Category-wise, the expenditure on feed estimated to the tune of Rs.13521 and Rs. 15743 per farm on marginal and small farms which constituted about 22.48 and 21.38 per cent to the total variable cost, respectively. Green fodder and dry fodder were the next important cost components and an amount of Rs.19531 and Rs. 12264 per farm was incurred on these components by the sampled farmers in the study area. The relative share of above said components to the total cost turn out to be 29.31 and 18.18 per cent, respectively.

Category-wise, the proportionate share of green fodder and dry fodder to the total variable costs was 30.56 and 16.76 per cent on marginal farms while the corresponding figures for small farms came to be 28.06 and 19.60 per cent, respectively. On overall basis, an amount of Rs. 114544 per farm was generated as gross income from dairy farming in the study area. Gross income received from dairy farming was higher on small farm (Rs. 134701 per farm) as compared to marginal farms (Rs.94388 per farm). Similarly, the net income earned from dairy animals was higher on small farms (Rs.61038 per farm) as compared to marginal farms (Rs. 34225 per farm).

The average value of income earned from different sources by the sampled households is given in Table 5. The results showed that, the extent of average annual family income generated from all sources was Rs. 467093 per farm per annum in the study area. The sampled farmers in Punjab earned maximum portion of their income from agriculture and allied activities. The extent of income generated from agriculture (Rs.265323 per farm) was more than that of dairy (Rs. 114554 per farm) and the proportionate share of agriculture and dairy to the total family income turned out to be 55.60 and 25.27 per cent, respectively. The also shows that total income earned by marginal and small farmers were Rs. 337425 and Rs. 596761 respectively. The income earned from agriculture were Rs. 173002 and Rs. 357645 of marginal and small farmer respectively.

Although, the extent of income earned by small farmers (Rs.134701per farm) from dairy farming was more than that of marginal farmers (Rs. 94388 per farm) in absolute term, but it was higher among marginal farmers in terms of per cent share to the total income. Since the income generated from agriculture sector alone, was not adequate to sustain the livelihood of marginal and small farmers in the study area. Therefore, most of the sampled farmers were also found to be engaged in some non-farming activities to supplement their income. On overall basis off-farm was Rs.51005 which constituted 11.68

Table 4: Costs and returns structure of milch animals of sampled farmers in Punjab, 2018-19 **(Rs./farm/annum)**

Particulars	**Marginal**		**Small**		**Overall**	
Items	**(Rs.)**	**Per cent**	**(Rs.)**	**Per cent**	**(Rs.)**	**Per cent**
Green fodder cost	18388	30.56	20674	28.06	19531	29.31
Dry fodder cost	10085	16.76	14443	19.60	12264	18.18
Feed cost	13521	22.48	15743	21.38	14632	21.93
Medicine and others Charges	1680	2.80	2484	3.37	2082	3.08
Human labour charges	15272	25.38	18821	25.56	17046	25.47
Interest on working capital	1217	2.02	1498	2.03	1358	2.03
Total variable costs	**60163**	**100**	**73663**	**100**	**66913**	**100**
Gross income	94388		134701		114544	
Net income	**34225**		**61038**		**47631**	

Table 5: Average gross farm family income from different sources of sampled farmers in Punjab, 2018-19 (Rs./farm/annum)

Source of income	Marginal Farmers		Small Farmers		Overall	
	(Rs.)	Per cent	(Rs.)	Per cent	(Rs.)	Per cent
Agriculture	173002	51.27	357645	59.93	265323	55.60
Dairy farming	94388	27.97	134701	22.57	114544	25.27
Vegetables	18685	5.54	41315	6.92	30001	6.23
Sale of livestock	1864	0.55	2319	0.39	2091	0.47
Rent from leased out land	-	-	7396	1.24	3698	0.62
Hiring out Agri. Labour	860	0.25	-	-	430	0.13
Sub total	288799	85.58	543376	91.05	416087	88.32
Govt. emp.	18170	5.39	17413	2.92	17791	4.15
Private emp.	11013	3.27	10879	1.82	10946	2.54
Pensions	7301	2.16	5990	1.01	6645	1.58
Remittances	8758	2.59	14359	2.41	11558	2.50
Trader	3384	1.01	4744	0.79	4064	0.91
Sub total	48626	14.42	53385	8.95	51005	11.68
Total	**337425**	**100**	**596761**	**100**	**467093**	**100**

per cent of total income. It is observed that extent of off- farm income of small farmers (Rs.53385) was more than marginal farmers (Rs.48626). Major share of off-farm income was govt. employee, its values was 5.39 and 2.92 per cent of marginal and small farmers respectively. Private employee constituted 3.27 and 1.82 per cent of total income of marginal and small farmers respectively. Total off-farm income comprised 14.42 and 8.95 per cent of total income of marginal and small farmers.

Conclusion and Policy Implications

The study showed that on overall basis, the labour used for crop production came out 1020.36 hours per farm. On per farm basis, the magnitude of family labour and hired labour was estimated to the tune of 347.01 and 673.35 hours, which accounted for 34.01 and 65.99 per cent share to the total human labour employment, respectively. The total human labour generated from dairy farming income out 89.71 days per annum. On per farm basis, the magnitude of family labour and hired human labour was estimated to 87.02 and 2.69 days which accounted for 97 and 3 per cent share to the total human labour employment, respectively. The study also showed that major share of income was agriculture, it comprised 55.60 per cent of income per farm on over all situation. The non-agriculture activities act as second major sector which constituted 11.68per cent of total farm income. The dairy also acts as allied sector in earned income, its share was 25.27 per cent of total income. It means that small farmers cannot depends only on agriculture sector, because they also earned major share of income from allied sectors. For the improvement in allied sectors and increase overall income there is greater need to frame suitable policies.

The broad results which have emerged from this research include that on the basis of 300 days of work per year as full employment, an under-employed sampled farmer was found to be deficient in work by 172 days per year per farm on an overall farm situation. Govt. schemes like MGNREGA are important for generating employment in off seasons for upliftment of the standards of livings.

As small and marginal farmers have limited land holding so they have alternative to increase their income through rearing more numbers of animals of high yielding breeds. It can also help in increase his employment. The nature of employment in agricultural sector was mostly seasonal and the extent of employment generated from this sector was very low. Therefore, subsidiary occupation such as dairy farming, poultry and piggery etc should be developed in the rural areas. It would provide gainful employment and generate extra income to supplement their family. Efforts should be made to increase the level of income among marginal and small farms households by providing the proper price of their crops, by providing debt at low rate of interest, subsiding the agricultural seeds and other inputs.

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Appendix

Particulars	Marginal	Small	Overall
Average Area operated (Acres)	1.71	3.80	2.75
Average Herd size (Numbers)	3.14	4.01	3.58

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