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# Integrated Farming Systems Approach of PAU Awardee Farmers for Income and Employment Enhancement in Punjab

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### Authors' contributions

This work was carried out in collaboration between all authors. Authors RS and TSR designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Authors RS, TSR and JSG managed the analyses of the study. Author JSG managed the literature searches. All authors read and approved the final manuscript.

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## ABSTRACT

A study was conducted during 2011-12 on the Punjab farmers under the name of "Integrated Farming Systems Approach of PAU Awardee Farmers for Income and Employment Enhancement in Punjab" to find productivity, profitability and employment generation of integrated farming system as compared to conventional cropping system under Punjab conditions. The study comprised of two integrated farming systems viz., crop + fruit farming system and crop + poultry farming system. Both these integrated farming systems were productive and profitable than that of sole cropping system. The net returns increased by 3.24 per cent and .60 per hectare with inclusion of fruits and poultry enterprises, respectively over sole cropping system. The study also indicated that crop + fruit farming system generated 28.51 mandays/hectare/annum/farm employment for family, 44.57 mandays/hectare/annum/farm for hired labour and 73.08 mandays/hectare/annum/farmers total labour. In case of crop + poultry, it was observed that employment generated through crop + poultry farming system for family labour was 36.54 mandays/hectare/annum/farm, for hired labour was 58.25 mandays/hectare/annum/farm and for total labour was 94.79 mandays/hectare/annum/farm.

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## 1. INTRODUCTION

In India agriculture has always been considered as the back-bone of our economy. People have learnt ways and means to harvest resources for our food, clothing and shelter. India is an agriculture based country and 70 percent of rural population is engaged in agriculture and eighty per cent of populations live, directly or indirectly, on income derived from agriculture. One-third of National income comes from agriculture. Likewise Punjab is one of leading state of Indian agriculture. Now state is passing through complex problems such as soil degradation, deficiency of multi-nutrient deficiencies and decreasing water table which is further also affected by climate changes. In modern agricultural crop is dependent on the use of chemical pesticides, inorganic fertilizers and growth regulators which cause resource depletion, environmental deterioration and loss of crop diversity. The major reason for these problems is the continuous cultivation of traditional crops like wheat-paddy, excessive use of insecticides, pesticides, weedicides etc. and other unhealthy farming patterns. To overcome the problems and to make the agriculture profitable, there is time to shift from traditional pattern to alternative crops like pulses, oil seeds, cotton, maize, fibre crops, fruits, and vegetables etc. There is also need to encourage other enterprises like beekeeping, dairy, mushroom cultivation, fruit production, floriculture, forestry, vegetable, and fishery etc. for additional income generation. Farming system approach is adequate combination of different enterprises which interact with environment and agriculture inputs without dislocating the ecology on one hand and meeting the national goal on other hand.

In western Uttar Pradesh some farmers adopt sugarcane based farming system has been found predominant. Livestock, vegetables, cereals and sugarcane have been observed to be main source of income. The study indicated that cross bred breeding programme has become popular due to low demand of milk of cross-bred cows. Credit has significant impact on farm income and credit requirement of about 86 per cent farmers which was from the institutional sources. Fragmentations and sub-division of landholdings, scarcity of labour, low yield of crops, less reliable markets, scarcity of owned-fund, depleting natural resources, non-availability

of good quality seeds and sheds for poultry, etc have been identified as the major constraints to promote integrated farming system in this area [1]. For better management of farm resources Integrated farming system assume greater importance to enhance the productivity besides reducing the environmental degradation. It was an appropriate approach to minimize risk and increase the production, profit and employment with better utilization of resources [2]. Organizations of agriculture are based on hired labour. All categories of farmers hire labour but medium and large farmers heavily dependent on hired labour [3].

There is one major issue which is neglected since long time i.e. employment of agriculture labour which decreases by entry of machines like combines, potato planters, seed drills etc. In crop based farming system the requirement of labour decreases and due to less employed people started moving to urban areas for employment. If people are adopting farming system based on subsidiary businesses like crop + fruit farming, Crop + poultry farming etc. then there is more options of employment in rural areas.

## 2. METHODOLOGY

The compressive study was conducted during 2011-12. The Punjab Agricultural University awards prizes to progressive farmers at farmers fair for the adoption of latest technologies and this concept which was started in 1997 in memory of a progressive farmer, Sardar Dalip Singh Dhaliwal. Since 1997, forty-nine farmers have been awarded for their excellent performance in agricultural activities. All these awardee farmers till 2011 by Punjab Agricultural University Ludhiana, Punjab were selected as respondents. A list of respondents was taken from Directorate of Extension Education, Punjab Agricultural University, Ludhiana, and all of them were respondents for study. It comprises of 60 awardee farmers by Punjab Agricultural University, Ludhiana for their achievements in agriculture sector. The respondents were belonged to Bathinda, Tarantaran, Muktsar, Gurdaspur, Patiala, Roopnagar, Moga, Sangrur, Kapurthala, Ferozpur, Barnala, Ludhiana, Amritsar, Ropar, Jalandhar, Nawasehar, Faridkot and Hoshiarpur districts of Punjab State.

An appropriate research instrument *i.e.* questionnaire was prepared as per the objectives of the study to collect the data from the

respondents. A questionnaire was prepared for the data collection which was based on the criteria approved by Punjab Agricultural University, Ludhiana for selection of the farmers for the various awards. It consisted of study of different farming system adopted by progressive farmers. It also dealt with employment generated for family labour and hired labour through different integrated farming system. The data were collected personally by the researcher by visiting the study area and interviewing the respondents. Proper precautions were taken to ensure unbiased response of the respondents by providing them necessary instructions after explaining the objectives of study. The present study comprised of income enhancement and employment generation of 2 farming systems i.e. Crops + Fruit farming system and Crops + Poultry farming system.

### 3. RESULTS AND DISCUSSION

The results presented in Table 1 indicate that net returns from only crops per hectare was Rs. 58990 in crops +fruit farming system but with second enterprise fruit trees the net return increases to Rs. 60968 per hectare. There was Rs. 68960 (3.24%) increase in net returns per farm due to fruits. The increase is due to income flow from fruits. Gill et al. [4] reported that there are a number of farmers who are running these farms in profitable ways by the use of modern and stable techniques.

The results in Table 2 clearly shows that the net returns from only crops per hectare was Rs. 57728 but with second enterprise poultry the net return increases to Rs. per 58075 per hectare. Total net returns per farm from crops + poultry farming system were Rs. 728836 and total net returns per hectare was 58075. There was Rs. 4349 (.60%) increase in net returns per farm due to poultry. The residue, urine and litter used as poultry manure. Gill et al. [5] observed from study that the maximum return (Rs79,064/ha) was earned from fisheries + piggery + poultry as compared to Rs 5,33,221 from the rice-wheat system and registered 48.6% gain. This also generated additional employment of about 500 man days/ha/annum.

Data in Table 3 indicates that employment generated through crop + fruits farming system for family labour in crop was 817.23 mandays/annum/farm (40.22%) and for hired labour 1214.51 mandays/annum/farm (59.78%).

Fruits increase the family labour by 21.61% mandays /annum/farm, hired labour by 27.94% mandays/annum/farm and total labour by 25.39% mandays /annum/farm. Employment generated through crop + fruits farming system for family labour was 28.51 mandays/hectare/annum/farm, for hired labour was 44.57 mandays / hectare / annum/farm and for total labour was 73.08 mandays/hectare/annum/farm. Same study was conducted by Behera and Mahapatra [6].

**Table 1. Economics of the crops +fruit farming system**

Area under crops	34.86 ha	
Area under fruits	14.41 ha	
Cost Items	Rs/farm	Rs./ha
<b>Crops</b>		
Seed	101303	2906
FYM & Fertilizers	173812	4986
Plant Protection	90706	2602
Irrigation charges	78540	2253
Fuel & Mobile Oil	121940	3498
Hired-in labour	250539	7187
Land rent	232063	6657
Miscellaneous	199120	5712
Total	1248023	35801
Interest on variable cost	62401	1790
Total Variable cost	1310424	37591
Interest on fixed capital	87289	2504
Depreciation on fixed capital	79725	2287
Total fixed cost	167014	4791
Total cost	1477438	42382
<b>Returns from crops</b>		
Gross Returns	3533828	101372
Total cost	1477438	42382
Net Returns	2056390	58990
<b>Fruits: Costs</b>		
Plants	4893	
FYM & Fertilizers	30651	
Plant Protection	29668	
Labour charges	517304	
Miscellaneous	32458	
Interest on working capital	30749	
Fixed Cost	9254	
Total	654977	
<b>Returns from fruits</b>		
Gross Returns	723937	
Total cost	654977	
Net Returns	68960	
Total net returns from crops and fruits per farm	2125350	
<b>Total net returns from crops and fruits per hectare</b>	<b>60968</b>	
<b>Additional net return due to fruits/farm</b>	<b>68960</b>	
<b>Percentage increase in net returns due to fruits</b>	<b>3.24%</b>	

**Table 2. Economics of the crops + poultry farming system**

Area under crops	12.55 ha	
No. of birds	133.33	
Cost Items	Rs/farm	Rs./ha
<b>Crops</b>		
Seed	33465	2667
FYM & Fertilizers	63051	5024
Plant Protection	31394	2502
Irrigation charges	26461	2108
Fuel & Mobile Oil	45615	3635
Hired-in labour	90100	7179
Land rent	84898	6765
Miscellaneous	73732	5875
Total	448716	35754
Interest on variable cost	22436	1788
Total Variable cost	471152	37542
Interest on fixed capital	27001	2152
Depreciation on fixed capital	24340	1939
Total fixed cost	51341	4091
Total cost	522494	41633
<b>Returns from Crops</b>		
Gross Returns	1246981	99361
Total cost	522494	41633
Net Returns	724487	57728
<b>Poultry Farming</b>		
Cost of chicken	1729	
Labour charges	152	
Feed	2154	
Medicine	233	
Interest on fixed capital	428	
Total	4695	
<b>Returns from poultry farming</b>		
Gross Returns	9044	
Total cost	4695	
Net Returns	4349	
Total net returns from crops and poultry farming per farm	728836	
<b>Total net returns from crops and poultry farming per hectare</b>	<b>58075</b>	
<b>Additional net returns due to poultry/farm</b>	<b>4349</b>	
<b>Percentage increase in net returns due to poultry/farm</b>	<b>.60%</b>	

**Table 3. Employment pattern of crop +fruits farming system**

Enterprise	(Mandays/Annum/farm)					
	Family labour		Hired labour		Total labour	
	Days	%age	Days	%age	Days	%age
Crops	817.23	40.22	1214.51	59.78	2031.74	100.00
Fruits	176.62	34.24	339.28	65.76	515.90	100.00
Crops+Fruits	993.85	39.01	1553.79	60.99	2547.64	100.00
% increase/farm	21.61%		27.94%		25.39%	
Per ha employment	28.51		44.57		73.08	

The figures given in Table 4 show that employment generated through crop + poultry farming system for family labour in crop was 341.27 mandays/annum/farm (41.63%) and for hired labour 478.58 mandays /annum/farm (58.37%). Poultry increase the family labour by

34.38% mandays/annum/farm, hired labour by 52.75% mandays/annum/farm and total labour by 45.10% mandays/annum/farm. Through crop+ poultry farming system employment for family labour generated was 36.45 mandays/hectare/annum/farm for hired labour

**Table 4. Employment pattern of crop +poultry farming system**

Enterprise	(Mandays/Annum/Farm)					
	Family labour		Hired labour		Total labour	
	Days	%age	Days	%age	Days	%age
Crops	341.27	41.63	478.56	58.37	819.83	100.00
Poultry	117.32	31.73	252.46	68.27	369.78	100.00
Crops+Poultry	458.59	38.55	731.02	61.45	1189.61	100.00
% increase/farm	34.38%		52.75%		45.10%	
Per ha employment	36.54		58.25		94.79	

was 58.25 mandays/hectare/annum/farm and for total labour was 94.79 mandays/hectare/annum/farm. Same study was conducted by Khieu et al. [7], Kathiresan [8].

#### 4. CONCLUSION

Thus, it can be concluded that integrated farming system is the only way to get more profits from the agriculture and to generate the human labour as compared to mono cropping. Urine and litter of poultry used as poultry manure. Farmers can earn profit margins and can generate high employment opportunities by adopting integrated farming systems approach. Integrated farming system reduces the cost of production by recycling the residues in the field and also helps to conserve water, soil health and nutrients.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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