

## Income and consumption pattern of marginal and small farmers in Punjab: An analysis from livelihood security perspective

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### ABSTRACT

The present study has examined the role of various factors, especially of off-farm income and farm business income from dairy, towards the livelihood security of marginal and small farmers along with the analysis of their income and expenditure pattern in Punjab. It has been found that dairy and off-farm income were the major players in the economy of the marginal and small farmers. The contribution of dairy towards growth in farm business income was more in comparison to contribution of crop production. It has been witnessed that the dairy enterprise not only compensated the decline in employment in crop production but also ensured the net gain in employment on marginal and small farms. As far as nutritional security of these farmers is concerned, it was found that the marginal and small farmers' families were experiencing a shortfall in the consumption levels of fruits, vegetables, pulses and fats and oils while they were consuming milk over and above the recommended levels. The study has suggested that in order to ensure livelihood security of marginal and small farmers, all efforts should be made to promote dairy farming and create off-farm employment opportunities. Besides, these farmers must produce fruits, vegetables and pulses at their own farm in order to have an economic access to balanced food.

**KEY WORDS :** Farmers, Farm income, Livelihood

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### INTRODUCTION

Agriculture continues to hold the prime place in Indian economy since time immemorial. It is well known that farming in India, is the major occupation supporting 67 per cent of the population for their livelihood and about 17 per cent of gross national product is derived from this sector of the economy in 2008 (National Accounts Statistics, 2009). The rapid increase in population, subdivision and fragmentation of land holdings and the changed family system from joint to nuclear families in rural India has made the size of holdings smaller and smaller. The small and marginal farmers account for nearly 82 per cent of the total operational holdings in the country, cultivating about 39 per cent of the total area (Government of Punjab, 2009). This group is mainly embroiled in the vicious cycle of low savings and even dissavings, low investments and low returns. Besides this, the major problems of this group are surplus family labour, both under nutrition and

malnutrition and the possession of un-economic size of farm holdings, which keep them in the state of poverty (Pandey and Kaushal, 1980). Punjab is one of the most progressive states of India and is having a similar type of land distribution though much better than the Indian situation. Out of 9.97 lakh total holdings, as per the agricultural census of 2000-01, the number of small and marginal holdings was 1.73 lakh (17.4%) and 1.23 lakh (12.3%), respectively.

It has been noticed in Punjab that living in nearly the same socio-economic environment, some of the marginal and small farmers have been able to achieve livelihood security while others have failed to do so. There are multiple factors responsible for this. Broadly, the likely factors are education level of the farmers, family size, farm size, fixed investment, off-farm income, domestic expenditure and the productivity of crops. Earlier studies conducted by Pandey and Kaushal (1980), Vaidya (1993) and Singla

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(2003) identified that credit and improved technology were the only factors which ultimately affect the viability of marginal and small farmers. It was, therefore, suggested that reorganization of limited land and surplus family labour along with crop diversification, livestock development and adoption of supplementary avocations do have the potential to make the marginal and small farmers financially viable. This paper endeavours to examine the contribution of these factors, especially of off-farm income and farm business income from dairy, towards the livelihood security of small and marginal farmers along with the analysis of their income and consumption pattern.

## **METHODOLOGY**

The study is based on the primary survey of 240 marginal and small farmers (120 marginal and 120 small farmers) selected from three districts of Punjab state, viz., Ropar, Ludhiana and Bathinda, each representing a different agro-climatic zone. Three-stage-stratified random sampling technique was adopted for the selection of respondents. The three stages of selection comprised of the development block as the first stage-sampling unit, village as the second stage unit and operational holding as the third-stage unit. Two blocks from each district and two villages from each block were selected randomly. From each village, 10 marginal farmers (< 2.5 acre) and 10 small farmers (2.5-5.0 acre) were randomly selected. The farm business income of the farming families was calculated by deducting the operating expenses from the gross farm income of each farm family. Off-farm income was calculated by summing up the income earned from various non-farm sources like service, pension, business, hiring out labour, etc., by the farming family. Total disposable income was derived by adding the off-farm income to the farm business income of the farming family. In order to examine the imbalances, if any, in the food intake of the marginal and small farm families, a comparison of actual and normative consumption was made. The normative consumption was calculated as per the accepted standards of the Indian Council of Medical Research

(I.C.M.R.) for the farming families. The viability of marginal and small farmers was worked out by subtracting all the farm and domestic expenses from the farm family income of the respective farming family. The farm family income is comprised of the income earned by the farmer from both the farm and non-farm sources.

## **OBSERVATIONS AND DISCUSSION**

The results obtained from the present investigation have been discussed in the following sub heads :

### **Analysis of farm business income:**

Table 1 provides the information of farm business income (including the income from crop production and dairy), off-farm income and the disposable income. The average total disposable income of a marginal farmer was Rs. 54535.86 and out of it 36.89 per cent came from crop production, 25.11 per cent from dairy and 38.00 per cent from off-farm activities. On small farms, the contribution of crops, dairy and off-farm activities in the total disposable income was 53.38, 20.80 and 25.82 per cent, respectively. In this way dairy and off-farm income were major players in the economy of marginal and small farmers.

The temporal behaviour of farm business income of marginal and small farmers has been studied by taking the data from the research project titled, 'Economics of Farming in Punjab', wherein farm level data on almost each aspect of the agricultural economy of the state were collected every year with cost accounting method. The results presented in Table 2 show that the average per farm total farm business income of marginal farmers increased from Rs. 8622 in the triennium 1987-90 to Rs. 13626 in the triennium 2003-06 at 1980-81 prices. The increase was more pronounced from dairy enterprise as the farm business income from dairy increased at the growth rate of 0.99 per cent per annum. On the other hand, the annual growth rate of farm business income from crops was just 0.71 per cent. The contribution of dairy towards the farm business income growth was as high as 75.02 per cent in comparison to the 24.98 per cent

**Table 1: Income from crops, dairy and off-farm activities of marginal and small farmers (Rs. per farm family/annum)**

Particulars	Marginal	Small
Farm business income from crops	20118.97 (36.89)	43201.85 (53.38)
Farm business income from dairy	13695.01 (25.11)	16830.30 (20.80)
Total farm business income	33813.98 (62.00)	60032.15 (74.18)
Off-farm income	20721.88 (38.00)	20900.96 (25.82)
Total disposable income	54535.86 (100.00)	80993.11 (100.00)

Figures in parentheses indicate percentage to total disposable income

Source: Singh, 2006

**Table 2 : Farm business income from crops and dairy in Punjab, 1987-90 to 2003-06 (In Rs. per farm at 1980-81 prices)**

Year	Marginal	Small
<b>Crops</b>		
1987-90	4857 (56.60)	10751 (69.10)
1993-96	5860 (55.00)	10660 (60.90)
2000-03	5984 (45.40)	13557 (62.60)
2003-06	6107 (44.82)	14619 (62.93)
<b>Dairy</b>		
1987-90	3765 (43.40)	4803 (30.90)
1993-96	4791 (44.00)	6837 (39.10)
2000-03	7201 (54.60)	8110 (37.40)
2003-06	7519 (55.18)	8610 (37.07)
<b>Total</b>		
1987-90	8622 (100.00)	15554 (100.00)
1993-96	10651 (100.00)	17497 (100.00)
2000-03	13185 (100.00)	21667 (100.00)
2003-06	13626 (100.00)	23229 (100.00)
<b>CGR (%)</b>		
Crops	0.71	0.77
Dairy	0.99	0.94
Total	0.87	0.83
<b>Contribution to growth (%)</b>		
Crops	24.98	49.60
Dairy	75.02	50.40

Source: Research Scheme, 'Economics of Farming in Punjab', Government of Punjab.

contribution of crop production. The average per farm total farm business income of small farmers went up from Rs. 15554 in triennium 1987-90 to Rs. 23229 in the triennium 2003-06 witnessing an almost 1.5 times increase. The farm business income increased from Rs. 10751 to Rs. 14619 and Rs. 4803 to Rs. 8610 for crop production and dairy, respectively, during this period. The growth rate of farm business income from dairy was much higher (0.94%) than that of crop production (0.77%). The contribution of crop production and dairy towards increase in the farm business income was 49.60 and 50.40 per cent, respectively. The analysis of the growth of farm business income and its segregation into its two components confirms the hypothesis of growing importance of dairy in the farm economy of marginal and small farmers.

#### Economic viability analysis:

The distribution of marginal and small farmers into viable and non-viable classes is presented in Table 3. The farmers who have ensured their livelihood security, which means that they are earning enough money to meet their

**Table 3 : Distribution of marginal and small farmers into viable and non-viable (Numbers)**

Farm-size categories	Viable	Non-viable	Total
Marginal	64 (53.33)	56 (46.67)	120 (100.00)
Small	101 (84.17)	19 (15.83)	120 (100.00)
Overall	165 (68.75)	75 (31.25)	240 (100.00)

Figures in parentheses indicate the percentage to total number of farmers in the respective category Source: Singh, 2006

farm as well as domestic expenditure, are termed as viable farmers and remaining as non-viable farmers. The domestic expenditure included the expenses made by the farming families on consumption of food items such as cereals, pulses, vegetables, fruits, edible oils, milk and milk products, sugar/jaggery, tea, liquor/poppy, meat, eggs, spices, etc., whereas the non-food items included the expenses made on clothing, education, fuel and lighting, toiletries, foot wear, health services, social ceremonies, travelling, telephone bills, etc. Out of total domestic expenditure of marginal and small farmers, the proportionate expenditure on food items came to be 62 per cent while the respective expenditure on non-food items was estimated to be 38 per cent. After counting for the total expenditure, it was found that out of total 240 sample farmers in the state, the number of viable and non-viable farmers was 165 (68.75%) and 75 (31.25%), respectively. It was further found that out of 120 marginal farmers, 53.33 per cent were viable farmers while 46.67 were non-viable. In case of small farmers only 15.83 per cent were non-viable farmers.

The factors responsible for viability and non-viability of farmers were identified by applying the discriminant analysis. Discriminant function analysis is a statistical technique used to differentiate between two or more classes, based on the common variables. It helps in measuring the net effect of a variable by holding the other variables constant. The results of the discriminant function analysis on marginal farms (Table 4) brought out that total fixed investment on crops and dairy, off farm, value productivity of crops and net income from dairy were the significant discriminating factors accounting for 13.72, 39.71, 1.27 and 35.52 per cent contribution, respectively towards total distance between viable and non-viable farmers. In case of small farmers farm size, off-farm income and net income from dairy were the significant discriminating factors with 36.60, 27.83 and 21.70 per cent contribution, respectively towards the discriminating distance between viable and non-viable small farmers in the state.

The discriminant analysis carried out for the total of

**Table 4: Particulars of discriminant function on marginal and small farms in Punjab**

Items	Mean		Mean difference (di)	Discriminant coefficient (Li)	Discriminating distance (Li)(di)	Per cent contribution to the total distance
	Viable	Non-viable				
<b>Marginal</b>						
X <sub>1</sub> - Education (Years)	4.95	4.13	-0.8203	0.0303220	-0.0249	-1.28
X <sub>2</sub> - Family size (Number)	5.41	5.11	-0.2991	-0.1233235	0.0369	1.90
X <sub>3</sub> - Farm size (Acres)	1.89	1.89	0.0007	0.04778719	0.0000	0.00
X <sub>4</sub> - Total fixed investment (Rs.)	70636.39	51221.95	-19417.4500***	-0.0000137	0.2660	13.72
X <sub>5</sub> - Off-farm income (Rs.)	29412.89	12782.18	-16630.7100***	-0.0000463	0.7700	39.71
X <sub>6</sub> - Domestic expenditure (Rs.)	40728.47	43488.32	2759.8520	0.0000646	0.1783	9.19
X <sub>7</sub> - Value productivity from crops (Rs./acre)	11145.85	8970.71	-2175.1480**	-0.0000111	0.0241	1.27
X <sub>8</sub> - Net income from dairy (Rs.)	37325.26	24253.23	-13072.0300***	-0.0000527	0.6889	35.52
D-square					1.9393***(6.81)	100.00
<b>Small</b>						
X <sub>1</sub> - Education (Years)	4.69	6.42	1.7280	0.1301771	0.2249	7.48
X <sub>2</sub> - Family size (Number)	5.77	5.47	-0.2986	0.2167726	-0.0647	-2.15
X <sub>3</sub> - Farm size (Acres)	3.75	3.18	-0.5658***	-1.9443660	1.1001	36.60
X <sub>4</sub> - Total fixed investment (Rs.)	94014.59	100477.90	6463.3130	0.0000096	0.0620	2.06
X <sub>5</sub> - Off-farm income (Rs.)	24765.35	3094.74	-21670.6000***	-0.0000386	0.8365	27.83
X <sub>6</sub> - Domestic expenditure (Rs.)	49520.38	52952.37	3431.9920	0.0000351	0.1205	4.01
X <sub>7</sub> - Value productivity from crops (Rs./acre)	15264.30	12745.17	-2519.1360	-0.0000295	0.0743	2.47
X <sub>8</sub> - Net income from dairy (Rs.)	37460.82	21666.24	-15794.5800***	-0.0000413	0.6523	21.70
D-square					3.0059*** (5.65)	100.00
<b>Marginal + Small</b>						
X <sub>1</sub> - Education (Years)	4.79	4.71	-0.0812	0.0574427	-0.0047	-0.21
X <sub>2</sub> - Family size (Number)	5.64	5.20	-0.4364	-0.0080485	0.0035	0.16
X <sub>3</sub> - Farm size (Acres)	3.03	2.22	-0.8085***	-0.9018751	0.7292	32.42
X <sub>4</sub> - Total fixed investment (Rs.)	84943.47	63700.12	-21243.3500***	-0.0000036	0.0765	3.40
X <sub>5</sub> - Off-farm income (Rs.)	26564.39	10328.03	-16236.3700***	-0.0000383	0.6219	27.64
X <sub>6</sub> - Domestic expenditure (Rs.)	46102.30	45885.88	-216.4258	0.0000246	-0.0053	-0.24
X <sub>7</sub> - Value productivity from crops (Rs./acre)	13671.72	9926.90	-3744.8130***	-0.0000587	0.2198	9.77
X <sub>8</sub> - Net income from dairy (Rs.)	37405.95	23597.86	-13808.1000***	-0.0000441	0.6089	27.06
D-square					2.2498*** (14.09)	100.00

Figures in parentheses indicate the F-ratio

\*\*\* and \*\* indicate significance of values at P=0.01 and 0.05, respectively

Source: Singh, 2006

marginal and small farmers in the state revealed that the role of farm size in discriminating the farmers into viable and non-viable groups was significant with 32.42 per cent contribution to the total distance. Other important variables, which contributed significantly towards total distance, were the off-farm income, net income from dairy and value productivity of crops with 27.64, 27.06 and 9.77 per cent share, respectively while fixed investment on crops and

dairy played the least role by 3.40 per cent contribution in discriminating distance between the viable and non-viable marginal and small farmers.

#### **Human labour employment in crop production *vis-à-vis* dairy:**

Punjab has witnessed a continuous decline in the labour employment in crop production due to the intensive

**Table 5: Human labour employment in crop production vis-a-vis dairy in Punjab (Man days/farm/year)**

Period	Marginal			Small		
	Dairy	Crop	Total	Dairy	Crop	Total
1987-90	136	109	245	166	206	372
1993-96	149	106	255	206	181	387
2000-03	186	82	268	213	163	376
2003-06	187	83	271	219	165	384
Absolute change	+52	-26	+26	+53	-41	+12

Source: Research reports, Economics of Farming Scheme

and extensive use of tractors, harvesting combines and other labour saving tools (Sidhu and Bhullar, 2004). The labour absorption capacity of agriculture has declined over time. In early 1970, the employment elasticity with respect to aggregate agricultural output was 0.54 which means that one per cent increase in output brought out about 0.54 per cent increase in labour employment (Sidhu, 2002). By the early 80s, it came down to 0.49 and in the late eighties it further slumped to 0.36 (Bhalla, 1993). At present, it is less than 0.2, which means that to bring about one per cent annual growth in labour employment, the agricultural output growth rate must be more than 5 per cent. In this situation, the worst affected are the agricultural labourers and the marginal and small farmers who employ their family labour to carry out the farming operations. In the absence of gainful employment opportunities outside agriculture, these farmers strive to find employment opportunities in allied agricultural enterprises such as dairy, poultry, etc.

Table 5 points out that the average employment on marginal farms in man days per farm increased from 245 in triennium 1987-90 to 271 man days per farm in triennium 2003-06. The employment during this period in crop production declined from 109 man-days to 83 man days with an absolute change of minus 26 man days per farm per annum. On the contrary, the employment in dairy increased from 136 man days per farm per year in the triennium 1987-90 to 187 man days in the triennium 2003-

06 with an absolute positive change of 52 man days. In this way, the decline of employment in crop activity was not only compensated by the increase in employment in dairy but there was a net gain in total employment by 26 man days. Similarly, there was a net decline of employment in crop production by 41 man days on small farms during this period. In contrast the employment in dairy went up by 53 man days per farm per year. Again, the dairy not only compensated the decline in employment in crop production but also ensured the net gain in employment by 12 man days per farm per year on small farms.

#### Consumption and nutritional security:

In spite of strenuous efforts to provide nutritional security to each and everyone, the marginal and small farmers do not have adequate access to balanced food. These farmers produce the milk and milk products at home and largely fulfill their nutritional requirements by substituting milk for other sources of vitamins, proteins, etc., such as fruits, vegetables and pulses. Table 6 provides the information about the consumption of cereals, pulses, vegetables, fruits, milk and fats and oils by the marginal and small farmers' families.

It can be seen from Table 6 that on an average the family of marginal farmers required 649.41 kg of cereals per annum but the actual consumption was 615.52 kg, resulting in a shortfall of 33.89 kg. Similarly, the annual shortfall in the consumption of pulses, vegetables, fruits

**Table 6: Requirements of various food items at recommended level and the actual consumption (Kg/household/year)**

Food items	Marginal farmers			Small farmers		
	Recommended requirement	Actual consumption	Total	Recommended requirement	Actual consumption	Total
Cereals	649.41	615.52	-33.89	790.37	788.78	-1.59
Pulses	125.85	40.42	-85.43	149.80	49.33	-100.47
Vegetables	422.67	174.52	-248.15	521.95	194.90	-327.05
Fruits	64.53	21.60	-42.93	64.24	25.98	-38.26
Milk	376.68	1277.92	+901.24	433.62	1480.08	+1046.46
Fats and oils	62.93	39.56	-23.37	74.90	45.39	-29.51

Source: Singh, 2006

and fats and oils was to the tune of 85.43, 248.15, 42.93 and 23.37 kg, respectively. It was only milk in which case the annual consumption per family was 1277.92 kg while the requirement was 376.68 kg as estimated on the basis of recommendations of Indian Council for Medical Research. The same situation prevailed for the small farmers' families as shown in the Table. For small farmers', the annual shortfall, per family, in the consumption of pulses, vegetables, fruits and fats and oils was 100.47, 327.05, 38.26 and 29.51 kg, respectively. However, the consumption of milk per family was 1480.08 kg compared to the requirement of 433.62 kg. The consumption of milk is higher because it is provided at home while for pulses, vegetables, fruits and fats and oils, the farmers are dependent on the market. The imbalanced consumption of various food articles may lead to the incidence of deficiency related diseases due to lack of essential carbohydrates, vitamins and minerals in the diets of marginal and small farmers. Similarly, the excessive use of milk may also lead to many diseases/disorders such as heart problems, indigestion, fat and cholesterol deposition. Therefore, these energy-giving foods should strictly be taken within the recommended doses while the excess expenditure on milk may be shifted towards such diets, which provide carbohydrates, vitamins and minerals. The farmers must be educated to produce vegetables, fruits and pulses on a small scale for domestic consumption through kitchen gardening. The net house technology which means growing of vegetables under protected conditions to avoid the adverse affects of extreme weather conditions under the open field and also for pesticide free production of vegetables holds much promise for this to happen along with augmenting the income by way of enhanced production and better quality of the produce. The farmers can also rationalise their consumption by selling milk and in turn purchasing fruits, vegetables, pulses, etc.

### Overview:

The foregoing analysis brings out that dairy farming is emerging as a major contributor to the income, employment and economic viability of marginal and small farmers along with the off-farm income. In order to ensure the livelihood security of the farmers, all out efforts should be made to promote dairy and create off-farm employment opportunities. The farmers should rationalise their domestic

expenditure and also produce fruits, vegetables, pulses, etc. on own farm for domestic consumption using net house technology for which the government provides financial support also. In this way, it will not only ensure the nutritional security of these households but will also provide these eatables with minimum pesticides and other harmful residues.

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