ECONOMIC FACTORS RESPONSIBLE FOR NET INCOME VARIATION ON SMALL FARMS IN SOUTHERN PUNJAB, PAKISTAN

Athar Jalil, Manzoor Ahmad, Azhar Abbas* and A. D. Sheikh**

ABSTRACT

Many factors are involved in the variation of net income on small farms at every location where agricultural activities take place. A study was conducted in the Faculty of Agricultural Economics and Rural Sociology, University of Agriculture, Faisalabad, Pakistan during 2005-06 to ascertain various factors which contribute towards the net income variation among the marginal farmers in southern Punjab. The results revealed the importance of seed rate, land rent, fixed cost items and distance from main road. An additional rupee spent on seed, fertilizer and pesticide contributed Rs. 0.47 to the net income of small farmers. The coefficient for land rent, interest and depreciation was 0.45 while it was 0.57 in case of cost associated with labour. It also showed that there was a difference of about Rs. 14,000 between the high net income group and low net income group of marginal farmers. The variables included in the model showed about 64 percent variation in the dependent variable (net income). Proper training of farming community, easy access to inputs and output markets and developed infrastructure facilities are suggested to hasten economic development in the study area.

KEYWORDS: Farm area; farm inputs; income; Punjab; Pakistan.

INTRODUCTION

A significant portion of rural population in developing countries depends primarily upon small scale and subsistence-oriented agriculture based on family labour. They have limited access to resources, technology, alternative livelihood and means of production. In developing countries like Pakistan, majority of rural population depends on farming through production, processing and distribution of major agricultural commodities. This part of society is helpless and hopeless if the upshot of its business (so-called)

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lacks the capacity to fulfill their genuine needs to keep its body and soul together.

In our country, small farms (≤12.5 acres) have a numerical predominance. Out of total (27.83 million acres) farm area of Punjab, 13.13 million acres are occupied by the farms not exceeding 12.5 acres in size. These small holdings constitute 85 percent of the total farms and account for 48 percent of total farm area (5).

Successful small farmers pursue a fundamentally different approach in farming. They are low input users and reduce their reliance on purchased inputs by substituting management of their internal resources (land and labour) for commercial technology. In general, they substitute labour and management for capital and purchased inputs and focus on creating value and reducing costs (1). They are niche marketers and may sell directly to the local customers. These farmers build relationships with their customers and thus are far less vulnerable to ups and downs of commodity markets than are conventional farmers. Based on these facts, many small farmers earn income more than conventional large farmers (6).

Small units of farming sector appear to be one of major constraints in the process of modernization and commercialization of agriculture. At ‘micro’ level, low productivity on small farms results in poor living standards and consequently a very low investment potential of farm families. At ‘macro’ level, certain serious problems are generated, which may encompass food deficiency, unemployment, rural urban migration, etc. With the passage of time problems of small farmers are becoming more acute with increasing population (1.9%/annum) which causes high man-to-land ratio on small farms (4).

The farmers have to take different decisions at farms for profit maximization. In order to maximize net returns from his farming business, a farmer has to decide about the input mix and enterprise combination. It is necessary that knowledge about costs and returns of a farm be provided to him, which may help him in choosing the proper combination of enterprises and ensuring the optimum use of resources (7).

The present study was conducted to achieve following specific objectives:

- To recognize various sources and levels of income for small farmers along with determining input use and cost structure of different income groups of small farmers.
- To evaluate the economic factors responsible for net income variation on
small farms.
• To suggest some policy guidelines for reducing the income difference on small farms.

**MATERIALS AND METHODS**

This study was conducted in the Faculty of Agricultural Economics and Rural Sociology, University of Agriculture, Faisalabad, Pakistan during 2005-06. It was confined to district Dera Ghazi Khan, Punjab, where very little variation exists in soil, climate and other physical conditions. A multistage random sampling technique was adopted for sample selection. At first stage, a random sample of six villages from each tehsil of district D.G. Khan was selected. The planned study was based on small farms (≤12.5 acres). Sixty farmers from each tehsil while ten farmers from each village were randomly selected. As a whole, a sample of 120 farmers was selected for detailed investigation. Data on net income of the farm, farm size, total fixed cost, variable cost, labour cost, education level, experience, cropping intensity, etc. were obtained through interview of sampled farmers.

For studying the relationship between farm income and independent variables, following regression equation was applied.

\[
Y = a_0 + a_1 X_1 + a_2 X_2 + a_3 X_3 + a_4 X_4 + a_5 X_5 + a_6 X_6 + a_7 X_7 + a_8 X_8 + a_9 X_9.
\]

where

\[
Y = \text{Net income of the farm (Rs.)}
\]

\[
a_0 = \text{Intercept.}
\]

\[
a_{1-9} = \text{Coefficients of explanatory variables.}
\]

\[
X_1 = \text{Farm size in terms of operational farm area of a farmer (acres).}
\]

\[
X_2 = \text{Sum total of fixed cost components (land rent; interest and depreciation of machinery and implements, interest and depreciation of livestock, interest and depreciation of sheds) measured in Rs.}
\]

\[
X_3 = \text{Sum total of labor cost (paid to artisan, family, casual and permanent hired labor) measured in Rs.}
\]

\[
X_4 = \text{Education (years of schooling).}
\]
$X_5 = \text{Experience (years)}.$

$X_6 = \text{Distance from main road.}$

$X_7 = \text{Sum total of variable cost components (plant protection, seed, FYM, fertilizer, water purchase, tractor hired) measured in Rs.}$

$X_8 = \text{Cost of livestock feeding and miscellaneous costs measured in Rs.}$

$X_9 = \text{Cropping intensity as ratio of total cropped area/year to total cultivated farm area}^*100(\%)$.

**Net income**

Net income was calculated by deducting total cost from gross income, i.e.

$$\Pi = \sum_{i=1}^{n} P_i Y_i - \sum_{j=1}^{k} \sum_{i=1}^{n} P_{ij} X_{ij}$$

$\Pi = \text{Net income}$

$P_i Y_i = \text{Gross income}$

$P_{ij} X_{ij} = \text{Total cost}$

**RESULTS AND DISCUSSION**

**Net income**

The respondents were categorized into high net income group and low net income group based on their net earnings per acre. The net income of high income group was greater than Rs. 15,000 (Rs. 19614.68) while that of low net income group was less than Rs. 15,000 (Rs. 9748.84) (Table 1).

<table>
<thead>
<tr>
<th>Category</th>
<th>Gross income (Rs./acre)</th>
<th>Total cost (Rs./acre)</th>
<th>Net Income (Rs./acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High net income group</td>
<td>57,530.43</td>
<td>37,915.75</td>
<td>19,614.68</td>
</tr>
<tr>
<td>Low net income group</td>
<td>43,252.50</td>
<td>33,503.66</td>
<td>9,748.84</td>
</tr>
<tr>
<td>Overall</td>
<td>50,391.47</td>
<td>35,714.74</td>
<td>14,676.73</td>
</tr>
</tbody>
</table>

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In case of total cost, both groups differed as the high income group could invest more as compared to low income group.

Estimated model for factors affecting the net income of small farmers showed that it was affected by several factors. Using multiple regression analysis (Table 2) to analyze the effects of various factors on gross income of small farmers, following equation was estimated;

\[ Y = -12164.63 + 89.41X_1 + 0.45X_2 + 0.57X_3 + 132.54X_4 + 30.49X_5 - 1478.72X_6 + 0.478X_7 + 0.0703X_8 + 59.84X_9 \]

**Explanation of the model**

The \( R^2 \) statistic indicated that the model as fitted explained 64.2 percent of the variability in dependent variable. The adjusted \( R^2 \) statistic, which is more suitable for comparing models with different number of variables, was 61.5 percent. Most of the estimated coefficients had desired and appropriate signs and testify to expected relationship between explanatory variables and dependent variable i.e. net income. It can be remarked that this relationship holds true when we use net income in regression analysis.

The results of other independent variables dependent variable are discussed below.

**Operational holding (X\(_1\))**

The coefficient for this variable amounted to 89.41 which was non-significant with a fairly high standard error (Table 2). It showed that each additional acre will contribute about Rs. 89.41 to the net income when all other factors are held constant. This is because the operational holdings of the respondents were quite low. Due to this reason this variable cannot significantly contribute to the income variation among the small farmers.

**Table 2. Results of regression analysis for overall net income group.**

<table>
<thead>
<tr>
<th>Explanatory variables</th>
<th>Co-efficients</th>
<th>S.E.</th>
<th>T-value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-12164.63</td>
<td>24715.68</td>
<td>0.492</td>
<td>0.624</td>
</tr>
<tr>
<td>X(_1)</td>
<td>89.41 NS</td>
<td>341.17</td>
<td>0.262</td>
<td>0.794</td>
</tr>
<tr>
<td>X(_2)</td>
<td>0.457**</td>
<td>0.333</td>
<td>4.375</td>
<td>0.000</td>
</tr>
<tr>
<td>X(_3)</td>
<td>-0.570 NS</td>
<td>0.797</td>
<td>-0.715</td>
<td>0.476</td>
</tr>
<tr>
<td>X(_4)</td>
<td>132.540 NS</td>
<td>280.06</td>
<td>0.473</td>
<td>0.637</td>
</tr>
</tbody>
</table>

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The coefficient for this variable was estimated to be 0.45 being highly significant with a fairly low standard error (Table 2). In this case, each additional rupee invested on land rent, farm implements and tools (farm machinery) contributed about Rs. 0.45 to the net income when all other factors are kept constant. The coefficient with its sign is in accordance with expectations of economic theory.

**Labour cost (X₃)**

The coefficient for this variable amounted to -0.57 which was non-significant depicting that each additional rupee associated with labour costs contributed Rs.0.57 to the net income of small farmers when all other factors remain constant.

**Education-years of schooling (X₄)**

The coefficient for this variable was 132.54 being non-significant. It showed that each additional year of schooling of the farmer would contribute about Rs.132.54 to the net income.

**Experience in years (X₅)**

The value of this variable was 30.49 which was found to be non-significant with a fairly low standard error (Table 2). It can be argued that gain in the experience of farming has showed positive but insignificant impact. This result indicated that each additional year of experience would increase gross income by about Rs. 30.5 which is quite insignificant. This is mainly due to the fact that only experience does not matter if it is not combined with skills, techniques and up-to-date knowledge of the farming practices.

**Distance from main road (X₆)**

The parameter of this variable amounted to -1478.72, which was significant with a fairly high standard error. It revealed that more the distance of farm
from the main road, the greater will be the decrease in gross income of the farmers. In real farming practices, this fact may be observed due to one or the other reason. First, as the distance from main road/distance from main market increases, the chances of damage to the produce due to physical injury or mishandling are more as the transportation infrastructure is not much improved. This ultimately results in contraction of the total revenue and hence gross income. Secondly, long distances from main road/main market increase the cost of transportation thereby decreasing the gross income of the farmers.

**Costs associated with seed, fertilizer, spray and FYM (X7)**

The value of coefficient for this variable amounted to 0.47 which was significant at 5 percent level with a fairly low standard error. In this case each additional rupee spent on seeds, fertilizers, plant protection measures and farm yard manure contributed about Rs. 0.47 to the gross income when all other factors are kept constant. Thus it is clear that there is a positive relationship between the gross income (and hence net income) and expenditure on primary inputs.

**Costs associated with livestock (X8)**

This variable had 0.0703 coefficient value which was non-significant with a fairly low standard error. It provided evidence that each additional rupee spent on the livestock contributed about Rs. 0.0703 to the gross income and hence net income when all other factors are kept constant.

**Cropping intensity (X9)**

The coefficient value of this variable i.e. 59.84 was highly significant with a fairly high standard error. It showed that one percent increase in this variable contributed Rs. 59.840 to the gross income when all other factors were kept constant.

These results agree to those of Abbas (2) who concluded that gross income of small farmer is significantly and positively affected by family, casual and permanent hired labour, seed, fertilizer application, plant protection and farm yard manure costs. These results are also in line with the findings of Abbas and Sheikh (1) who reported benefits of increased cropping intensity and varying cropping pattern.

**CONCLUSION AND SUGGESTIONS**

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The net income earned by the high net income group was found to be Rs. 19,614 while it was Rs. 9,748 for low net income group with the difference of Rs. 9,866 between these two groups. The operational land holdings had non-significant impact on net income variation as the land holdings of the respondents were quite small but the investment made in terms of utilization of variable factors on this land had a significant impact. Similarly, effect of distance from the main road and hence from the market had a pronounced effect on the net income variability. Education and experience had not much significant impact mainly due to the fact that most of the marginal farmers are engaged in farming since long and almost all have same level of education. The effect of cropping intensity was also quite significant showing the desirability of intensive cultivation of land.

The analysis of results further conclude that small farmers are getting much lower incomes as compared to large farmers in the study area mainly due to the constraints of poor mechanization, less intensive cultivation, repeated and continuous cultivation of traditional crops over the years which led to the development of hardpan in subsoil and development of resistance among insects-pests. The analysis also conclude that fate of marginal (small) farm households is linked with the land holding they have and the output they obtain. It is suggested that these farmers may be provided with essential livelihood facilities including better health and sanitation, easy access to farm inputs and implements, regular and updated extension facilities, improved infrastructure and better marketing and product disposal environment. Similarly, as cropping intensity plays a vital role in income generation from the farms, there is a need to look for diversification of agriculture by introducing short duration crops like vegetables. A change in cropping pattern is expected to yield healthy benefits as sequential cropping pattern over a long period of time which may improve crop productivity. It is further suggested to improve transport and other infrastructure as the variable of distance from main road was found as a significant contributor to net income. This necessitates the improvement of farm to market roads, on-farm storage and processing facilities.

REFERENCES


