

Determinants of Poverty in Rural Areas: Case of Savejbolagh Farmers in Iran

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Abstract

The purpose of this study was to explore the determinants of poverty in rural areas of Iran, for which Savejbolagh Township located in the north of Iran, was selected. The study utilized farm and household cross-sectional data of 1998-99 that was collected through personal interviews with 350 farmers of Savejbolagh, who were selected by stratified random sampling. Different socio-economic factors were compared along the farmers' income deciles. For determining the factors that would affect the poverty a linear regression model (an earnings equation) was used for the analysis. The estimated coefficients of the regressions with positive sign show that the variables will increase the income and the negative sign show the reverse effects. The effects of explanatory variables on income are interpreted to have the reverse effects on poverty. The dependent variable is natural logarithm of the farmer's annual income. The explanatory variables included such variables as the number of sons, farmer's age and experience, level of education, type of production technologies, and town distance. The results show that, given the current technologies, types of education and other circumstances, alleviation of poverty and income disparities can be achieved by improvements in assets of the poor farmers. Implicit in these results is that in order to make human capital such as level of education effective in poverty alleviation, we need to introduce better technologies and

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more modern inputs to farmers. Improvements in better roads and communication facilities can also decline poverty.

1. Introduction

Poverty and income inequalities are two of the important disturbing factors on the way to development in the developing countries including Middle East and North Africa. The percentage of the population that fall below poverty line and the discrepancies in the distribution of income vary country to country and region to region (see Todarow, 1977, pp 30-32 and 143-186). The percentage of poor people and the income inequalities in rural areas have been larger than urban areas. In Iran in 1996 for example, people under first and second poverty line were 2.6 and 12.1 percent in urban areas, respectively; whereas the corresponding figures for rural areas were 7.8 and 22.9 percent. The poorest decile in rural areas comprised 1.5 percent of the total consumption of the country while the poorest decile in urban areas consumed 2.2 percent (Tabibian, 2000, pp. 10-11 and 168-169). We observe these discrepancies even in two adjacent regions of a single township, for example in Savejbolagh, which is selected for our study. The existence of these mentioned variations among the inequalities calls for region specific investigation including the investigations on determinants of poverty. That is what we aim to do in this paper.

Lack of information on the determinants of poverty in developing countries, especially in Iran, is one of the serious inhibiting factors for making right and effective policies for poverty alleviation. Some studies have been done on income distribution and poverty in Iran (Behdad, 1989; Mehryar, 1994; Nili, 1997; Pesaran, 1976; Plan and Budget Organization, 1996; Tabibian, 2000; and Tabibian and Mahani, 1996;), none of which have analyzed, at micro level, the factors determining poverty, especially in rural areas. Among the developing countries, India is a rare and perhaps the only country that has considerable farm and household data that makes the studies on the poverty of Indian rural areas possible (see the studies in Mellor and Desai, 1985; Reardon, 1995; and Sen, 1981). The purpose of this study was to explore on the income distribution and the determinants of poverty in rural areas of Iran, for which Savejbolagh Township was

selected. Peculiarities of the socio-economic conditions of the farms and the feasibility of collecting farm and household data were the reasons for selecting this township.

2. Methodology and Data

A. Methodology

Due to lack of information on the poverty lines and for avoiding unsubstantiated exaggeration on the magnitude of the poverty of Savejbolagh township, in this paper we do not deal with the analysis that underlies the poverty lines. Instead, we illustrate the income inequalities, by using the decile distribution of household income of the farmers. The decile distribution of other factors such as their different assets will be shown as well². For determining the factors that would affect the poverty we use a linear regression model (an earnings equation) for the analysis³. The estimated coefficients of the regressions with positive sign show that the variables will increase the income and the negative sign show the reverse effects. The effects of explanatory variables on income are interpreted as to have the reverse effects on poverty. The dependent variable is natural logarithm of the farmers annual income measured in 1000 Rials (about 800 Rials equal one U.S. Dollar). The explanatory variables are number of sons lived with the family; farmer's age, experience (farmer's age minus six minus years of education), and dummies for level of education; farmer's hectares of cropland, hectares of fruitland and livestock units; dummy for use of technology; and a quantitative variable of town distance. Regressions with other variables were also estimated but their estimated coefficients are

² . To be brief, we do not deal with Gini ratios because they show almost the same things, as the income decile ratios do. The income-decile-ratio approach might be preferred to Gini method. For example, we are mostly interested to know the changes in the relative income of the poorest to the richest individuals. With Gini ratio, however, we could have improvement in Gini ratio by solely improvements in the distribution of incomes between the two richest deciles and no improvement in the poorest decile. Hence the improvement in Gini ratio does not show the unchanged situation of the poorest decile as compared to the rest of the population (see Tabibian, 2000, p5).

³ . A logit regression model in which the dependent variable is a dummy with one for being poor and zero for nonpoor, could be used instead of earnings regression. In logit however, we would get opposite signs for the estimated coefficients that we would get in an earnings regression equation (Bardhan, 1985, p 93). In addition, in logit the estimated coefficients of the explanatory variables show some kind of probability of the effects of falling a person into the poor category. We did not use logit, again because in logit our dependent variable relies solely on how many of the population fall below the poverty lines—something that we lack the data for.

not reported here since they were not statistically significant. These other variables included family size, working off-farm, farmer's type of previous job, his father's type of job, variety of farmer's sources of income, and type of farm main enterprise. Very few of the farmers were unmarried or female. Therefore, the variables of marriage and sex did not have statistically significant effect on income.

In most studies on poverty, such as those using household expenditure survey data, all families with different employment situation are considered. In our study, however, our sample includes only the self-employed farmers. Hence, further research is needed to investigate on the poverty of the individuals with other circumstances. One point of caution is that relative to other years, in the agricultural year of 1998-99, the year of our study, the area faced with a low level of rainfall and other types of precipitation so that in especially upland, the farmers have less access to ground water, and suffered from shortage of water. Hence, the results of the study might not necessarily represent those of regular years.

B. Data

The study utilizes farm and household cross-sectional data of 1998-99 that were collected through personal interviews with 350 farmers of Savejbolagh, who were selected by stratified random sampling. The area under the study was first classified into two districts of lowland and upland. Villages in each district were categorized on the basis of the population size. They were categorized into five sizes: holding upto 50, 51 to 100, 101 to 150, 151 to 200, and 201 and more families. Villages from each category and the farmers from each village were selected on a random basis. The 350 farmers of the sample were distributed among the districts and the villages on the basis of the distribution of the farms.

3. Results and Discussion

A. Savejbolagh and its Income Distribution

Savejbolagh is a township located in the northwest of Tehran province, Iran, which has recently separated from Karaj township. The population of the township was

223,701 in 1996 of which 53.4 percent lived in rural areas. The township includes 278 villages and two cities of Hashtgerd and Nazarabade-Moghadam. It includes the lowland district in the south and the upland (mountainous) district in the north. Inhabitants of the township have access to different size factories and manufacturing firms for their second jobs. Lowland workers with an average of 17 kilometers distance to the cities (as compared to an average of 21 kilometers for upland workers) have better roads and commuting and communicating facilities, and better and less costly access to labor market for their nonagricultural second jobs. While the farmers of both districts are involved in crop production, fruit production is an important enterprise in lowland and livestock production in upland (See Table 1). As Table 1 shows lowland farmers with about 37 million Rials of average annual income are richer than the upland farmers whose annual income is about 34 million Rials.

Table 1 here

Table 1 also shows that the farmers obtained more than 85 percent of their income from crop, fruit, and livestock products and less than seven percent of their income from second jobs.

The distributions of farmers' assets by income deciles are shown in Table 2.

Table 2 here

Values of Table 2 show that the quantity of all of the three types of assets_cropland, fruitland, and livestock units_generally increases as we move from the poorest income decile to the richest decile. Regression results, that will be illustrated later, support these correlations by statistically significant positive effects of these assets on the level of farmers' household income.

Distribution of farmers' average household income, use of technology, and the town distance by income deciles and districts in Savejbolagh are shown in Table 3.

Table 3 here

As Table 3 shows, the ratios of income of the richest decile to the poorest decile for lowland district, upland district, and total township are 9.9, 58.6, and 31.5, respectively. The corresponding figures for the quantiles are 5.9, 24.0, and 13.2. These figures show that income distribution among the upland farmers with lower average income was worse than lowland farmers. This is consistent with other research results that the distribution of

income is worse in poorer populations. The percentage of farmers who used the technology (machine for harvesting wheat and barley) increases as the farm income increases. Use of technology, to some extent, introduces a better other farming practices as well. Upland district is farther to the city and a general decrease in town distance is observed as we move from poorest to richest deciles.

Although some preferences for larger families (around five members) are observed among lowland middle income families, yet no strong correlation between family size and level of income is observed (see Table 4).

Table 4 here

For the number of sons, with ten years and larger who live with family, however, a slight positive correlation with the level of income is observed. This of course was shown by the statistically significant positive relationship in our regression estimates.

Table 5 shows that on the average, farmers of the township were 30 percent illiterate,

Table 5 here

23.1 percent could read and write, 31.1 percent had primary school diploma, and 15.7 percent had higher than primary school diploma. It is interesting that the upland farmers who had lower income were less illiterate (23.8 percent) than the lowland farmers (23.8 percent). Except for the upland that the illiteracy level decreases as the level of income increases, we do not generally see any pattern that the level of education follows the level of income. Neither, in the regression analysis we found statistically significant relationship between the levels of education and the levels of income.

B. Regression Results

Means and standard deviations of the variables used for estimating the regressions are shown in Table 6 and the regression results are shown in Table 7. The estimated

Table 6 here

Table 7 here

coefficients show statistically significant positive effects of cropland, fruitland, livestock units, and town distance for both districts. Number of sons lived with the family, and technology had statistically significant positive effects on income in upland district but not in the lowland. Age, experience, and the level of education of the farmers, that were

the important personal characteristics, did not show statistically significant effects on the level of income. One explanation for insignificance of age and experience is that recently more summer crops are grown in the township that have substituted for their traditional crops such as potato. The new crops need more skilled work that is done by new commers to the farming activities. The explanation for insignificance of education could be that for the current farming activities, education, especially the formal type, is not seriously needed⁴. The results imply that in both districts of Savejbolagh township what could increase the level of income (or could decrease the poverty) were mainly assets_cropland, fruitland and livestock. In upland, however, besides the mentioned three types of sassets, number of sons which by some definitions is an asset, and the town distance are income determining factors as well. It can be concluded that given the current technologies, types of education and other circumstances, alleviation of poverty and income diparities can be achieved by improvements in assets of the poor farmers. Implicit in these results is that in order to make human capital such as level of education effective in poverty alleviation, we need to introduce better technologies and more modern inputs to farmers and offer them agricultural vocational trainings. Infrustructural improvements such as better roads and communication facilities can also decline poverty especially for upland district that suffers from low quality roads and communications.

4. Summary and Conclusions

This study tried to analyze the income disribution and the determinants of poverty in Savejbolagh township. From the two adjacent lowland and upland districts, lowland farmers are richer. Farmers of the township obtained more than 85 percent of their income from crop, fruit, and livestock products and less than seven percent of their income from second jobs.

The following results were obtained from comparing the farmers of different income deciles. The quantity of all of the three types of assets_cropland, fruitland, and livestock units_generally increases as we move from the poorest income decile to the richest decile. The ratios of the income of the richest decile to poorest decile for lowland disrict, upland district, and the total township are 9.9, 58.6, and 31.5, respectively. These figures

⁴ . Studies on the determinants of earnings in urban areas show positive significant effects of education on

show that income distribution among the upland farmers with lower average income was worse than lowland farmers. This is consistent with other research results that the distribution of income is worse in poorer populations. The percentage of farmers who used machine for harvesting wheat and barley increases as the farm income increases. A general decrease in town distance is observed as we move from poorest to richest deciles. For the number of sons, who live with family, however, a slight positive correlation with the level of income is observed. It is interesting that the upland farmers who had lower income were less illiterate (23.8 percent) than the lowland farmers (23.8 percent).

The following results were obtained from the regression estimates. The estimated coefficients show statistically significant positive effects of cropland, fruitland, livestock units, and town distance for both districts. Number of sons lived with the family, and technology had statistically significant positive effects on income in upland district but not in the lowland. Age, experience, and the level of the education of the farmers did not show statistically significant effects on the level of income. The results imply that in both districts of Savejbolagh township what could increase the level of income (or could decrease the poverty) were mainly assets_cropland, fruitland and livestock. In upland however, besides the mentioned three types of assets, number of sons which by some definitions is an asset, and the town distance are income determining factors as well. It can be concluded that given the current technologies, types of education and other circumstances, alleviation of poverty and income disparities can be achieved by improvements in assets of the poor farmers. Implicit in these results is that in order to make human capital such as level of education effective in poverty alleviation, we need to introduce better technologies and more modern inputs to farmers and furnish them with agricultural vocational trainings. Infrastructural improvements such as better roads and communication facilities can also decline poverty especially for upland district that suffers from low quality roads and communication facilities.

Table 1. Average Annual Income of the Farmers of Savejbolagh Township by Source of Income and District, 1999.

	Source of income (1000 Rials) ¹					Total
	Crops	Fruits	Live-stock	Second Job	Other sources ²	
Districts:						
Lowland						
(N=182)	14,023	10,245	8,817	1,942	1,851	36,878
%	38.0	27.8	23.9	5.3	5.0	100
Upland						
(N=168)	10,017	4,548	11,660	2,012	2,593	30,830
%	32.5	14.8	37.8	6.5	8.4	100
Total						
(N=350)	12,100	7,511	10,182	1,975	2,207	33,975
%	35.6	22.1	30.0	5.8	6.5	100

1. About 800 Rials= 1U.S. Dollar.

2. Includes such incomes as rent, retirement, and direct transfer payments from welfare programs.

Source: Calculated from sample data.

Table 2. Distribution of Farm Average Hectares of Land under Crops and Fruits and Livestock Units¹ by Income Deciles² and Districts in Savejbolagh Township, 1999.

Districts: Deciles from poorest to richest:	Lowland (182 farmers)			Upland (168 farmers)			Total (350 farmers)		
	Crops	Fruits	LS Units ¹	Crops	Fruits	LS Units ¹	Crops	Fruits	LS Units ¹
1 st	2.44	0.57	0.28	0.24	0.39	0.0	0.38	0.60	0.0
2 nd	2.32	0.83	1.67	0.36	0.85	0.0	1.37	0.65	3.96
3 rd	2.03	0.58	3.47	1.03	0.79	1.61	1.87	0.56	8.31
4 th	2.33	0.65	3.65	0.99	0.40	10.74	1.81	1.02	8.20
5 th	2.67	0.69	3.73	1.50	0.61	13.40	2.49	0.72	6.65
6 th	2.07	1.49	6.71	2.03	1.31	8.44	2.45	0.91	9.33
7 th	2.93	1.25	16.07	2.46	1.19	20.39	2.13	1.46	9.90
8 th	3.27	0.97	6.44	2.24	1.64	23.43	3.29	1.10	15.54
9 th	4.92	1.43	15.86	4.06	1.53	13.09	4.42	1.56	7.57
10 th	4.48	1.72	43.04	7.53	1.99	41.48	5.89	1.85	46.51
Average	2.94	1.02	10.04	2.25	1.07	13.29	2.61	1.04	11.60

1. Livestock units are calculated as each cow or bull=5, each heifer or steer=2.6, each sheep or goat=1, and each lamb = 0.6 units

2. Income deciles are shown in Table 3.

Source: Calculated from sample data.

Table 3. Distribution of Farmers' Average Household Income, use of Technology, and the Town Distance by Income Deciles and Districts in Savejbolagh Township, 1999.

Districts:	Lowland (182 farmers)			Upland (168 farmers)			Total (350 farmers)		
Deciles from poorest to richest:	Average income ¹	Techno logy ²	Town distance ³	Average income ¹	Techno logy ²	Town distance ³	Average income ¹	Techno Logy ²	Town distance ³
1 st	11,349	33.3	15.7	2,541	5.9	29.9	4,129	8.6	29.7
2 nd	16,386	50.0	22.7	5,610	5.9	30.3	9,555	28.6	20.3
3 rd	20,127	33.3	16.7	8,316	23.5	23.1	13,374	25.7	22.1
4 th	22,536	38.9	15.7	11,547	23.5	20.5	17,051	34.3	20.4
5 th	26,827	42.1	15.9	13,837	25.0	21.4	20,896	34.3	16.1
6 th	30,462	36.8	16.2	16,994	25.0	20.9	25,273	34.3	15.5
7 th	35,932	33.3	17.1	21,598	29.4	16.2	30,608	34.3	14.7
8 th	42,137	44.4	18.9	30,348	11.8	13.4	38,509	31.4	17.9
9 th	51,783	50.0	21.6	46,845	41.2	11.5	50,279	50.4	16.5
10 th	112,154	22.2	11.4	148,853	41.2	18.9	130,075	28.6	15.1
Average	36,878	38.5	17.2	30,830	23.2	20.6	33,975	31.1	18.8

1. In 1000 Rials; about 800 Rials= 1U.S. Dollar.

2. The percentage of the farmers who used technology, here using machine for harvesting wheat and barley.

3. The distance of the farm from the nearest town by kilometers.

Source: Calculated from sample data.

Table 4. Distribution of Average Farmers' Age, Family Size, and Number of Sons by Income Deciles and Districts in Savejbolagh Township, 1999.

Districts:	Lowland (182 farmers)			Upland (168 farmers)			Total (350 farmers)		
Deciles from poorest to richest:	Age of farmer	Family size	Number of sons ¹	Age of farmer	Family size	Number of sons ¹	Age of farmer	Family size	Number of sons ¹
1 st	54.2	4.1	1.6	70.9	4.2	1.2	67.7	4.5	1.4
2 nd	54.6	4.7	1.4	56.8	4.7	1.5	60.6	4.6	1.7
3 rd	52.4	5.2	2.1	61.4	4.5	1.7	55.5	4.8	1.8
4 th	52.9	5.0	1.9	58.6	5.5	2.2	52.8	4.3	1.4
5 th	49.5	4.2	1.7	54.4	4.3	1.3	56.5	4.7	1.7
6 th	53.2	5.4	2.5	53.8	4.3	1.5	54.9	4.7	1.9
7 th	53.2	4.3	1.4	61.0	4.1	1.4	51.4	5.0	2.1
8 th	52.3	4.8	1.7	60.1	4.8	1.7	58.7	4.6	1.6
9 th	56.9	4.7	2.0	55.3	4.9	1.8	52.3	4.8	1.8
10 th	59.1	4.7	2.3	60.2	4.8	1.9	60.1	4.6	2.1
Average	54.1	4.7	1.9	60.2	4.6	1.6	57.0	4.7	1.8

Number of sons with ten years age and older who live with their family.

Source: Calculated from sample data.

Table 5. Distribution of Average Farmers' Level of Education by Income Deciles and Districts in Savejbolagh Township, 1999 (percent).

Deciles from poorest to richest:	Illiterate ¹	Read & write	Primary sch.	Guidance sch.	High Sch.	Higher Edu.
Lowland district (182 farmers)						
1 st	38.9	16.7	27.8	16.7	0.0	0.0
2 nd	38.9	16.7	22.2	5.6	16.7	0.0
3 rd	16.7	16.7	61.1	5.6	0.0	0.0
4 th	22.2	11.1	50.0	5.6	11.1	0.0
5 th	26.3	15.8	31.6	5.3	21.1	0.0
6 th	36.8	10.5	42.1	10.5	0.0	0.0
7 th	50.0	11.1	27.8	5.6	5.6	0.0
8 th	27.8	11.1	38.9	16.7	5.6	0.0
9 th	44.4	22.2	22.2	0.0	5.6	5.6
10 th	55.6	11.7	22.2	0.0	5.6	0.0
Average	35.7	14.8	34.6	7.1	7.1	0.5
Upland district (168 farmers)						
1 st	58.8	35.3	5.9	0.0	0.0	0.0
2 nd	29.4	29.4	23.5	0.0	17.6	0.0
3 rd	17.6	47.1	11.8	11.8	11.8	0.0
4 th	23.5	41.2	29.4	5.9	0.0	0.0
5 th	31.3	37.5	18.8	6.3	6.3	0.0
6 th	18.8	18.8	25.0	18.8	12.5	6.3
7 th	17.6	29.4	35.3	0.0	11.8	5.9
8 th	17.6	23.5	35.3	0.0	11.8	11.8
9 th	11.8	17.6	47.1	0.0	17.6	5.9
10 th	11.8	41.2	41.2	0.0	5.9	0.0
Average	23.8	32.1	27.4	4.2	9.5	3.0
Total township (350 farmers)						
1 st	42.9	31.4	17.1	0.0	8.6	0.0
2 nd	25.7	40.0	17.1	11.4	5.7	0.0
3 rd	34.3	31.4	22.9	8.6	2.9	0.0
4 th	22.9	14.3	34.3	11.4	14.3	2.9
5 th	25.7	17.1	45.7	2.9	5.7	2.9
6 th	17.1	25.7	31.4	2.9	20.0	2.9
7 th	31.4	8.6	42.9	8.6	5.7	2.9
8 th	42.9	17.1	25.7	8.6	2.9	2.9
9 th	20.0	17.1	45.7	2.9	11.4	2.9
10 th	37.1	28.6	28.6	0.0	5.7	0.0
Average	30.0	23.1	31.1	5.7	8.3	1.7

1. Individuals with seven years and older.

Source: Calculated from sample data.

Table 6. Means and Standard Deviations of the Variables Used for Estimating the Regressions on the Farmers of Savejbolagh Township, 1999.

	Lowland district		Upland district		Total Township	
	Mean ¹	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Variables:						
Ln annual earnings	10.293	0.61	9.664	1.09	9.991	0.93
Annual earnings ²	36,878	37,996	30,830	61,492	33,974	50,668
Number of sons ³	1.87	1.46	1.64	1.22	1.76	1.35
Farmers' age (years)	54.10	14.51	60.23	13.87	57.04	14.51
Experience (years) ⁴	44.55	16.94	50.26	16.45	47.29	16.93
Education dummies ⁵ :						
Illiterate	0.357	0.480	0.238	0.427	0.3	0.459
Read and write	0.148	0.356	0.321	0.468	0.231	0.422
Primary school dip.	0.346	0.477	0.274	0.447	0.311	0.464
Guidance school dip ⁶	0.071	0.258	0.042	0.200	0.057	0.232
High school dip.	0.071	0.258	0.095	0.294	0.083	0.276
Higher education	0.005	0.074	0.030	0.170	0.017	0.130
More than prim. Sch.	0.148	0.356	0.167	0.374	0.157	0.364
Cropland (hectares)	2.94	2.72	2.25	4.24	2.61	3.55
Fruitland (hectares)	1.02	1.50	1.07	1.28	1.04	1.40
Livestock units ⁷	10.04	23.96	13.29	25.03	11.60	24.50
Technology Dummy ⁸	0.385	0.488	0.232	0.423	0.311	0.464
Town distance ⁹	17.2	10.0	20.6	12.7	18.8	11.5
Sample size	182		168		350	

1. Notice that if the means of the dummy variables are multiplied by 100, they show the percentages of the farmers who have that variable characteristic.
2. In 1000 Rials; about 800 Rials=1 U.S. Dollar.
3. Number of sons with ten years age and older who live with their family.
4. Calculated as farmer's age minus six minus years of education.
5. For seven years and older.
6. Eight years of schoolings.
7. Livestock units are calculated as each cow or bull=5, each heifer or steer=2.6, each sheep or goat=1, and each lamb = 0.6 units.
8. Dummy variable equals one if the farmer used technology, here using machine for harvesting wheat and barley.
9. The distance of the farm from the nearest town by kilometers.

Source: Calculated from sample data.

Able 7. Estimated Coefficients of the OLS Regressions, the Dependent Variable is Natural Logarithm of the Annual Earnings¹ of the Farmers of Savejbolagh Township, 1999.

Regressions	Lowland district		Upland district		Total Township	
	Est. coef.	T value	Est. coef.	T value	Est. coef.	T value
Explanatory variables:						
Number of sons ²	0.0324	1.32	0.1292***	3.17	0.0852***	3.4
Farmers' age (years)	-0.0123	-0.39	0.0505	1.30	-0.0121	-0.45
Experience (years) ³	0.0046	0.14	-0.0605	-1.55	-0.0007	-0.03
Education dummies ⁴ :						
Primary school dip.	-0.1056	-0.62	0.1744	0.89	0.0959	0.67
More than prim. Sch.	-0.1677	-0.50	-0.3797	-0.84	-0.0356	-0.12
Cropland (hectares)	0.1120***	6.98	0.0845***	6.51	0.1024***	9.81
Fruitland (hectares)	0.2074***	7.76	0.1966***	4.92	0.2181***	8.77
Livestock units ⁵	0.0106***	6.80	0.0210***	10.20	0.0161***	11.46
Technology Dummy ⁶	0.0022	0.03	0.2501*	1.93	0.2289***	2.84
Town distance ⁷	-0.0084**	-2.25	-0.0248***	-5.74	-0.0201***	-6.72
R ²	0.4660		0.6883		0.5643	
R ² (adj)	0.4348		0.6684		0.5515	
F ratio	14.92***		34.66		43.913***	
n ₁ , n ₂	10, 171		10, 157		10, 339	
SEE	35.92		61.98		131.02	
Intercept	10.252***	34.78	9.241***	20.48	10.166***	37.00

1. Annual earnings were measured by 1000 Rials; about 800 Rials=1 U.S. Dollar.
2. Number of sons with ten years age and older who live with their family.
3. Calculated as farmer's age minus six minus years of education.
4. For seven years and older.
5. Livestock units are calculated as each cow or bull=5, each heifer or steer=2.6, each sheep or goat=1, and each lamb = 0.6 units.
6. Dummy variable equals one if the farmer used technology, here using machine for harvesting wheat and barley.
7. The distance of the farm from the nearest town by kilometers.

*, **, *** Represent statistically significant at 10%, 5%, and 1% level.

Source: Estimated from sample data.

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