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Physical and Human Capital Factors Affecting Income Distribution among the Farmers of Savejbolagh Township, Iran

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Abstract

The purpose of this study is to investigate the effects of physical inputs and human capital factors on the distribution of income of the farmers in Iran, for which Savejbolagh township located in the north of Iran was selected. The study utilized a cross-sectional data set embodied farm and household data for 1999/00 agricultural year. The data was collected through personal interviews with 350 farmers of Savejbolagh. The farmers were selected by stratified random sampling. Savejbolagh included two distinct districts of lowland and upland. Among other descriptive information, Gini coefficients for income and land distribution among the farmers were shown. Logit model was used to estimate the likelihood of the effects of physical inputs and the human capital factors on farmers to fall in the lowest income quintiles. The farmers' income included those earned from agricultural (crops, fruits, and livestock) and non-agricultural (second job, transfer and rental) sources. The logit results showed that physical inputs of land used for crops and fruit production and the animal units had statistically significant negative effects on farmers to fall into the poorest income quintile. Meanwhile, education as a human capital factor did not show statistically significant negative effect. Furthermore, the results showed differences between the two districts of lowland and upland.

1. Introduction

Inequalities and poverty in Iran like many other countries are at top priority issues in policy makings. Study on income distribution, descriptive or diagnostic, at the country level or on a more limited population segment of the country would increase the insights of the decision makers and finally leads to better decisions. Numerous studies have been done on poverty and income distribution across countries, at country level, and on the local areas considering different dimensions and using different analytical methodologies. In Iran too, studies have been done on poverty and income distribution at country level (Behdad, 1989; Mehryar, 1994; Nili, 1997; Pesaran, 1976; Plan and Budget Organization, 1996; Tabibian, 2000; and Tabibian and Mahani, 1996) and on the local rural areas as well (Koopahi, 1977; and 1978; Toodehroosta, 2002; and Sadeghi et al, 2001). The investigation in this paper is on a rural area, Savejbolagh. However, it differs from the previous papers in the sense that it carries out a more refined analysis, as compared to the studies on Savejbolagh, and tries to answer the effects of the factors on poverty and income distribution using logit model for the analysis to show the likelihood of the effects.

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The purpose of this study is to investigate the effects of physical inputs and human capital factors on the distribution of income of the farmers in Iran, for which Savejbolagh township located in the north of Iran was selected. First, we explain the current inequalities in income and land by calculating their Gini coefficients. Second, we run a logit model to analyze the likelihood of the effects of different factors on the farmers to fall in the first (lowest) income quintile.

2.Data and Methodology

A. Data

The study utilizes farm and household cross-sectional data of 350 sample farmers of Savejbolagh in agricultural year of 1999/00[2]. The data was collected through personal interviews with these farmers 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 up to 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.

B. Methodology

In this paper Gini coefficients for income and land were calculated to show the inequalities, and logit model was used to estimate the likelihood of the effects of physical inputs and the human capital factors on farmers to fall in the lowest income quintiles. Since we could not, due to luck of data, measure the poverty line and we did not have access to information on already estimated poverty line of the farmers of Savejbolagh township, we arbitrarily used the first (lowest) income quintile as the poor category[3].

When we worked with Gini coefficient, we dealt with distribution and inequalities and when we worked with logit analysis, we dealt with factors affected inequalities in the sense that we explored on factors assisting or preventing the farmers to fall in poor category[4]. Inequality and poverty are not measured only by income. They relate also to such factors as education, health, and nutrition, security, power, social inclusion, consumption, and assets (McKay, 2002). Furthermore, factors that affect inequality and poverty can be categorized into two groups of assets and capabilities. The former includes material assets, both physical and financial (for example, land, housing, livestock, savings, and jewelry). The latter includes human capabilities (good health, education, and production and other life-enhancing skills),

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[2] This study uses data belonging to agricultural year of 1999/00 in when Iran was under sever drought and Ssavejbolagh township was to some extent affected by the drought as well. Hence, the results of this study should be used with caution.

[3] Although authors did not find any research results that showing poverty line in Iran, yet to give some figure for poverty line, from informal and causal information 4.5 US Dollars of family income per day could be an average poverty line in the country—and a guess for rural areas could be 4 US Dollars. On the basis of this guess, at least 20 percent of lowland and 40 percent of upland farmers earned income of less than poverty line in agricultural year of 1999/00.

[4] Inequality and poverty are related to each other and practically and generally decreasing inequality would decrease poverty (see McKay, 2002 for the definition of inequality and poverty and their dimensions and relations).

social capabilities (social life and the capacity to organize) and political capabilities (capability to represent oneself or others, access information, form associations, and participate in political life of a community or a country)[5]. In this study, on the basis of what could be done given the nature of the available data, we have tried to carry out the analysis to reach some results--while we are aware that there are points having been left out and need further investigations.

The farmers' annual income that was used for calculating Gini coefficients and for categorizing the farmers to quintiles, and for logit analysis, included those earned from agricultural (crops, fruits, and livestock) and non-agricultural (second job, retirement, transfer and rental) sources. The annual income was measured in Rials—8000 Rials equal one US Dollar. The income from agricultural sources was calculated as net income that is, by subtracting the costs of production from gross income. Costs of production did not include the farmer and his family unpaid labor neither did include the interest cost for owned land; however, it included the rent paid for rented land. The dependent variable in the logit equation was a dummy with its value equal one if the farmer's annual income felt in the first (lowest) income quintile and zero otherwise. The independent variables included the farmers' level of education to represent the human capital and for its control variables we included farmer's age, experience, if his previous job was farming, if the farmer had second job, and the number of sons lived with family. For physical inputs, we considered crop-land, and fruit-land hectares, and livestock units. Hectares of rented land and distance from nearest town were also included as control variables. When logit analyzed the aggregate lowland and upland districts, a district dummy variable was included in the model. Gender dummy was not included in the model because very few (less than one percent) of the farmers were female.

3. Results and Discussion

A. Savejbolagh descriptive information

Savejbolagh is a township located in the northwest of Tehran province, Iran, which has recently separated from Karaj tonwnship. The population of the township was 223,701 in 1996, 53.4 percent of which lived in rural areas. The township included 278 villages and two cities of Hashtgerd and Nazarabade-Moghadam. It included the lowland district in the south and the upland (mountainous) district in the north. Farmers of the township had access to different size factories and manufacturing firms for their second jobs. On the basis of sample data, the percentage of male farmers in the lowland, upland, and in the whole township was 99.5, 98.8, and 99.1, respectively. More descriptive information of Savejbolagh is shown in Tables 1 and 2. As Table 1 shows, lowland farmers with

Table 1 here
Table 2 here

about 37 million Rials of average annual income were richer than the upland farmers whose annual income was about 34 million Rials. As we will see from the Gini coefficients, the income and land inequalities were higher in upland as well, showing a worse income and land distribution. Upland farmers had more land under cultivation but lowland farmers had more livestock units. Farmers of the whole township were 30 percent illiterate, 23.1 percent could read and write, 31.1 percent had primary school

[5] See World Bank, 2002 for the explanations of these points.

diploma, and 15.7 percent had higher than primary school diploma. It is interesting that the upland farmers who had lower income were more educated than lowland farmers. They had fewer illiterates--23.8 percent as compared to 35.7 percent for lowland. Also, the percentage of farmers having higher than primary school diploma in upland was larger than that of lowland. Lowland farmers 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. More than 99 percent of the farmers were men. Rented land contained 11.5, 30.2, and 19.3 percent of total land in lowland, upland, and the whole township, respectively.

Figures in Table 2 show that farmers of lowland on the average were richer than those of upland. Enterprise combination was different in the two districts. Crop production was dominant enterprise in lowland--containing 38 percent of total annual income. But in upland, livestock with 37.8 percent of income was the dominant enterprise. Table 2 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.

B. Income and land Gini coefficients

Table 3 shows the Gini coefficients for income distribution and income category

Table 3 here

ratios for the farmers of Savejbolagh township by districts. The income Gini coefficient in lowland was .37 while for upland it was .58 which was much higher. This happened despite the fact that lowland farmers earned a lower average annual income, as we saw in Table 2. The fact that lowland farmers were in worse income inequalities could be seen by comparing the ratios of different income categories of the two districts as well. As expected comparable to the Gini coefficients, the ratios of the quintiles, too, show that inequalities were worse in upland than in lowland. In upland the ratio of the richest quintile to poorest was 22.7. For comparison, the corresponding figures for countries of Bolivia in 1997 were 32.5 and for Ghana and Latvia in 1998 were 7.8 and 5.3, respectively[6].

Table 4. shows the Gini coefficients for land distribution and land category ratios

Table 4 here

for the farmers of Savejbolagh township by districts. We calculated the figures of Table 4 to see how different were the land inequalities as compared to income inequalities, shown in Table 3. Comparing the figures in Table 4 with those in Table 3 we see that the Gini coefficients of income and land are very close and the same fact is observed for the ratios of income and land categories. It can be concluded that land is positively correlated to income. The same conclusion was reached by logit which will be explained in the following section.

C. Logit results

Table 5 depicts logit estimates (1), (2), and (3) that belong to lowland and upland districts and the total township, respectively. As Table 5 shows all logit estimates include the same

Table 5 here

[6] Derived from McKay (2002, p. 3).

variables[7] except that logit estimate (3) includes a dummy variable that controls for the district differences as well. The estimated coefficient for this dummy variable was statistically significant and with positive sign showing that upland farmers were more likely to fall in the poorest quintile. We pick up logit estimate (3) to discuss the results of the whole township and we refer to the other logit estimates for district specific results.

We considered the farmers' level of education to represent the human capital and for its control variables we included farmer's age, experience, if his previous job was farming, if the farmer had a second job, and the number of sons lived with the family. For physical inputs, we considered crop-land and fruit-land hectares, and livestock units. Hectares of rented land and distance from nearest town also were included as control variables. For checking the interactions, separate logits were estimated in which we included such variables as age multiplied by experience and age multiplied by second job; the results of which are not reported in this paper, since their estimated coefficients were not statistically significant.

The estimated coefficients for education in logit estimate (3) that were statistically significant with positive sign imply that the farmers with primary school or with higher level diplomas, as compared to those with lower levels of education and the illiterates, were more probable to fall in the lowest income quintile. The corresponding coefficients in logit estimates (1) and (2) were not significant showing that formal education in each of the districts did not have effect on odds of falling farmers in poor quintiles. These results are consistent with the results of other researches done using earning equations on low skill laborers. Sadeghi (1997), for example, showed that formal education did not have positive effects on the earnings of bakery workers in the city if Isfahan, Iran in 1992. Sadeghi (1998) in another study on the same city and the same year showed, however, that in other types of jobs (that required education) formal education had positive effects on earnings—in fact, the higher the level of education the more earnings were earned by the employees. A policy implication from the results of this study is that in order to improve the income of the farmers in Savejbolagh through human capital, one has to improve the farmers' knowledge and their skills by means other than formal education; for example, by technical and vocational trainings. On this aspect, of course, we need to have further appropriate investigation.

The estimated coefficient for farmers' age in logit estimate (3) was negative implying that the older the farmer was the less likely he would fell in poor quintile. One explanation for this is that the older farmers are more reliable, have more influence in their community and have more information that would lead to preparing their production inputs cheaper and to selling their product with better price. The sign for the significant estimated coefficient of the experience variable in logit estimate (3) was unexpectedly positive. This result could be justified by the fact that in Savejbolagh and especially in its lowland district the crop pattern has changed from traditionally grown crops to new crops recently. For example, sugar beet that has been traditionally grown in vast areas was hardly grown then. Instead, summer crops such as tomato and cucumber, that had city demand and easier to transport to the cities,

[7] Other logit regressions were run that included such variables as squired age, age multiplied by experience, age multiplied by previous job farming, and age multiplied by second job for muticollinearity checking, and dummies for other levels of education categories. Since their estimated coefficients were not significant the results are not reported.

were more grown—13.6 percent of the cultivated land in lowland district was under tomato and cucumbers while the corresponding figure was only 0.5 percent in upland.

It is interesting that the farmer's previous job of farming had unexpectedly positive effect on putting the farmer in poor quintile in lowland district, whereas, in upland it did the reverse. This could be explained by the fact that in lowland district the new-higher profit crops (summer crops such as tomato) were grown by new farmers who were not previously engaged in farming jobs. This fact was less relevant to upland district, that is to say that in upland farmers were more engaged with growing traditionally grown crops. Furthermore, upland farmers were more engaged with livestock production in which the farmers with more farming background could do a better job. Here we see that some theoretically expected points are not obtained by our analysis because of the considerable changes that have occurred in the economic structures of the community, changes that can not be explained by cross-sectional data. Using time series data perhaps could better explain the effects of the factors on income distribution—having access to time series data with the detail that was used in this study is almost impossible at time being, however. The estimated coefficient for having second job was with negative sign for both districts but statistically significant only for lowland. This is mainly because second job was more available to lowland farmers who had shorter distance to the cities. Number of sons (with ten years age and older) lived with the family showed negative effect on being in low income quintile in both districts. This is partly because in the annual net earnings we did not account for the costs of unpaid family members. The effect was stronger for upland district because, as compared to lowland, more unpaid family labor were involved in farming.

The estimated coefficient for crop-land was statistically significant with negative sign in the three logit estimates, implying that crop-land hectares decreased the likelihood that the farmer fell in the poor quintile in both districts. For fruit-land and livestock units, all of the estimated coefficients had negative sign however, only in upland district, they were not statistically significant. Therefore, in lowland district, fruit-land and livestock units had the same effects as land did but this fact did not hold in upland. Rented land hectares was included in the logit estimate as a control variable because it differed from owned land in the sense that for rented land we considered the amount of rent paid as a cost of production; For owned land, however, we did not consider any annual ownership costs (interest) because the farmer did not paid for it as cash or in-kind annually. Distance from nearest town did not show to be decisive in pushing the farmers into the poor quintiles.

4. Summary and Conclusion

The purpose of this study is to investigate the effects of physical inputs and human capital factors on the distribution of income of the farmers in Iran, for which Savejbolagh township located in the north of Iran was selected. The study utilized a cross-sectional data set embodied farm and household data for 1999/00 agricultural year. The data was collected through personal interviews with 350 farmers of Savejbolagh. In this paper we do two things first, we explain the current inequalities in income and land by calculating their Gini coefficients. Second, we run a logit model to analyze the likelihood of the effects of different factors on the farmers to fall in the first (lowest) income quintile.

Savejbolagh township included two distinct districts of lowland and upland. Comparing the two districts, on the average, upland farmers were more educated, older, more experienced, used smaller cultivated land, kept larger livestock units, and

smaller number of sons lived with the family. Furthermore upland was located farther to the nearest city. Upland also earned a lower annual income and had a worse income distribution. More than 99 percent of the farmers in the whole township were men.

Gini coefficients for income and land were close in the total township and in each of the districts showing that the distribution of income highly followed the distribution of land. Both income and land Gini coefficients were larger in upland showing that the inequalities were more sever in upland district. The ratios of income and land quintiles naturally gave similar results to those reached by corresponding Gini coefficients.

The farmers' annual income that was used for calculating Gini coefficients and for categorizing the farmers to quintiles, and for logit analysis, included those earned from agricultural (crops, fruits, and livestock) and non-agricultural (second job, retirement, transfer and rental) sources. In logit analysis the dependent variable equaled to one if the farmer was in the first (lowest) income quintile and zero otherwise. The independent variables were farmers' level of education to represent the human capital and for its control variables we included farmer's age, experience, if his previous job was farming, if the farmer had a second job, and the number of sons lived with the family. For physical inputs, we considered crop-land and fruit-land hectares, and livestock units. Hectares of rented land and distance from nearest town also were included as control variables. District dummy variable was included when the logit was estimated for the whole township. Logit results showed the followings: The estimated coefficients for education for the whole township showed that the farmers with primary school or with higher level diplomas, as compared to those with lower levels of education and the illiterates, were more probable to fall in the lowest income quintile. These results are consistent with the results of other researches done using earning equations on low skill laborers. A policy implication from these results is that in order to improve the income of the farmers in Savejbolagh through human capital, one has to improve the farmers' knowledge and their skills by means other than formal education; for example, by technical and vocational trainings. On this aspect, of course, we need to have further appropriate investigation.

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The estimated coefficient for crop-land was statistically significant with negative sign in the three logit estimates, implying that crop-land hectares decreased the likelihood that the farmer fell in the poor quintile in both districts. For fruit-land and livestock units, all of the estimated coefficients had negative sign however, in upland district, they were not statistically significant. Therefore, in lowland district, fruit-land

and livestock units had the same effects as land did but this fact did not hold in upland. The estimated coefficient of district dummy showed that upland farmers were more likely to fall in the poorest quintile.

In summary, shortage of physical assets and especially land pushed the farmers into poor income category while the farmer's education did not. This point can be kept in mind in policy decision makings.

Table 1. Descriptive Information for the Farmers of Savejbolagh Township, Agricultural Year of 1999/00.

	Lowland district		Upland district		Total Township	
	Mean[1]	Std. Dev.	Mean[1]	Std. Dev.	Mean[1]	Std. Dev.
Variables:						
Annual income[2]	36,878	37,996	30,830	61,492	33,974	50,668
Education dummies:						
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 schooldip[3]	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 primary.	0.148	0.356	0.167	0.374	0.157	0.364
Farmers' age (years)	54.10	14.51	60.23	13.87	57.04	14.51
Farmer's exp. (years)[4]	44.55	16.94	50.26	16.45	47.29	16.93
Number of sons[5]	1.87	1.46	1.64	1.22	1.76	1.35
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[6]	10.04	23.96	13.29	25.03	11.60	24.50
Town distance[7]	17.2	10.0	20.6	12.7	18.8	11.5
Gender (male = 1)[8]	0.995		0.988		0.991	
Rented land (% of total)[9]	11.5		30.2		19.3	
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. Maximum annual income of the farmer in the first quintile was 17,338,000, 6,540,000, and 11,549,000 Rials in lowland, upland and total township, respectively-- the corresponding means were 13,868, 4,076, and 6,842 Rials (8000 Rials = 1 U.S. Dollar).
3. 3. Eight years of schoolings.
4. Calculated as farmer's age minus six minus years of education.
5. Number of sons with ten years age and older who live with their family.
6. 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.
7. The distance of the farm from the nearest town by kilometers.
8. Toodehroosta (2002. p. 69).
9. Derived from Toodehroosta (2002. p. 62).

Source: Calculated from sample data.

Table 2. Average Annual Income of the Farmers of Savejbolagh Township by Source of Income and District, 1999/00.

	Source of income (1000 Rials)[1]					
	Crops[2]	Fruits[2]	Live-stock[2]	Second Job	Other sources[3]	Total
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 8000 Rials= 1U.S. Dollar.
2. Net income, calculated as gross income minus all costs except for unpaid farmer and his family labor and interest on owned land.
3. Includes such incomes as rent, retirement, and direct transfer payments from welfare programs.

Source: Calculated from sample data--Taken from Sadeghi, et al (2001) with some changes.

Table 3. Gini Coefficients for Income Distribution and Income Category ratios for the Farmers of Savejbolagh Township by Districts, 1999/00.

	District		
	Lowland	Upland	Total
Gini Coefficient for income distribution	0.37	0.58	0.48
Proportion of income for poorest 40%of the farmers	18.35%	9.57%	12.97%
Proportion of income for middle 40%of the farmers	37.11%	27.46%	34.26%
Proportion of income for richest 20%of the farmers	44.54%	62.97%	52.77%
Ratio of income of 20% richest to 40% poorest	2.4	6.6	4.1
Ratio of income of 20% richest to 20% poorest[1]	6.4	22.7	13.2
Ratio of income of 10% richest to 10% poorest	11.1	55.3	32.4

1. Derived from Toodehroosta, (2002, p. 73).
Source: Calculated from sample data.

Table 4. Gini Coefficients for land Distribution and land Category ratios for the Farmers of Savejbolagh Township by Districts, 1999/00.

	District		
	Lowland	upland	Total
Gini Coefficient for land distribution	0.39	0.56	0.47
Proportion of land used by 40% smallest land holders	16.15%	5.32%	11.33%
Proportion of land used by 40% medium land holders	39.12%	37.67%	39.03%
Proportion of land used by 20% largest land holders	44.74%	57.02%	49.64%
Ratio of used land by 20% largest holders to 40% smallest	2.8	10.7	4.4
Ratio of used land by 20% largest holders to 20% smallest[1]	7.2	53.8	23.2
Ratio of used land by 10% largest holders to 10% smallest	10.7	120.7	70.2

1. Derived from Toodehroosta, (2002, p. 75).
Source: Calculated from sample data.

Table 5. Logit Results for the Farmers of Savejbolagh Township in Agricultural Year of 1999/2000, the Dependent Variable Equals one if the Farmer Felt in the First (lowest income) Quintile[1] and Zero Otherwise.

Logit estimates number	(1) Lowland district (182 farmers)		(2) Upland district (168 farmers)		(3) Total Township (350 farmers)	
	Estimated Coef.	Stand. Error	Estimated coef.	Stand. error	Estimated coef.	Stand. Error
Explanatory variables:						
Education dummies[2]						
Primary school diploma	0.555	1.927	3.791	3.411	4.180**	1.816
Higher than primary School	-0.560	0.970	-0.250	1.465	1.526**	0.751
Farmers' age (years)	-0.005	0.201	-0.037	0.302	-0.350**	0.164
Farmers' experience (years)[3]	0.027	0.196	0.202	0.293	0.374**	0.161
Previous job (1 if farming)	1.314**	0.636	-5.392***	1.857	-1.107	0.697
Having second job (1 if yes)	-1.479**	0.611	-0.938	1.154	-1.131*	0.579
Number of sons[4]	-0.433*	0.190	-0.765**	0.351	-0.020	0.172
Cropland (hectares)	-0.754***	0.215	-1.604***	0.535	-0.600***	0.165
Fruitland (hectares)	-1.543***	0.404	-0.860	0.654	-0.961***	0.314
Livestock units[5]	-0.145***	0.051	-1.651	3.972	-0.139***	0.031
Rented land (hectares)	0.014*	0.007	0.064	0.044	0.018*	0.009
Distance from nearest town (kilometers)	0.032	0.028	0.051	0.036	0.032	0.020
District dummy (1 if upland)	--	--	--	--	1.842***	0.528
Constant	1.625	2.043	-6.446	4.079	-0.915	2.100
-2 Log likelihood	123.553		44.468		140.942	
Number of Farmers	182		168		350	

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

1. Maximum annual income of the farmer in the first quintile was 17,338,000, 6,540,000, and 11,549,000 Rials in lowland, upland and total township, respectively-- the corresponding means were 13,868, 4,076, and 6,842 Rials (8000 Rials = 1 U.S. Dollar).

2. Illiterate farmers and those with lower than primary school diploma are in the intercepts.

3. Calculated as farmer's age minus six minus years of education.

4. Sons with ten years of age and older who live with their family.

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

Source: Estimated from sample data.

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