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Research Paper

Determinants of Poverty among Smallholder Farms in Central District of Hatay Province, Turkey

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Abstract: The aim of this study was to examine poverty and its determinants in smallholder farms in the central district of Hatay province, Turkey. Data were collected from 73 small farmers by questionnaire. In the study, Headcount Ratio (HCR) and the Poverty Gap Index (PGI) were used to measure poverty. The Logit model was used to reveal the determinants of poverty. The results show that HCR and PGI were determined as 17.8% and 49%, respectively. In addition, considering the 50% of the median income of all farmers, the poverty line was calculated as ₺3740.9 and 13 farmers were found below the poverty line. The most important factors affecting poverty in small farms were determined as retirement status of the householder, social security status, household equivalent size and land size. We concluded that the presence of retirement and social security situations decreases poverty whereas increasing the number of equivalent households' increases poverty. Early retirement programs for small producers and ease of payment of social security premiums may contribute to poverty reduction in small holder farms.

Keywords: *Poverty, smallholder farm, headcount ratio, poverty gap index, Hatay.*

Introduction

Poverty is one of the main problems of underdeveloped and developing countries. According to the most recent estimates, in 2013, 10.7% of the world's population lived on less than US$ 1.90 a day (World Bank, 2018) and many countries have taken some political measures to reduce poverty. The definition of poverty varies depending on the country, the target group, and even the type of settlement. Although there is no universally accepted definition of poverty, it is accepted as a humanitarian issue which must be considered worldwide. In its simplest definition, poverty is the inability of individuals to meet their basic needs as human beings (Caglayan *et al*., 2012).

Approximately 45% of the world population lives in rural areas; this ratio increases to 64% in Africa and falls down to 25.6% in Turkey (FAO, 2018). The effects of poverty are felt more in rural areas than in urban areas. There are many factors that directly or indirectly affect poverty in the countryside. Among these are wrong policies applied in rural areas, inadequate distribution of agricultural resources, lack of irrigation water, individual and socio-economic factors preventing the adoption of innovations, traditional structure and cultural barriers, inability to diversify rural employment, low yield and income resulting from plant and animal diseases, and marketing problems caused by intermediaries. All of these problems result in significant declines in incomes and well-being of rural people, especially among the smallholder farmers.

The householders or managers of small farms in developing countries have to cope with the risks of small farm despite these small farms continue to contribute significantly to agricultural production, food security, rural poverty reduction, and biodiversity conservation (Thapa & Gaiha, 2011). For example, the use of new technologies in a farm requires more capital input, mechanization and a high level of education. Therefore, these requirements may pose more severe challenges for small farmers (Hazell *et al*., 2007).

Numerous studies have been conducted to reduce poverty in rural areas. Some of these studies determined the current poverty situation (Apata *et al*., 2010; Mbanasor *et al*. 2013; Bogale, 2011; El-Osta & Morehart, 2008; Rotich *et al*., 2017; Naschold, 2009; Profitable, 2016). Some others investigated the effects of gender (Ike & Oboh, 2009; Oluwatayo, 2014), credit access (Obisesan, 2013; Asogwa *et al*. 2012), and the effects of non-farm income on poverty (Vatta & Sidhu, 2010).

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Some studies have addressed small farmers, the most disadvantaged group in terms of poverty (Oluwatayo, 2014; Obisesan, 2013; Apata *et al*., 2010; Bogale, 2011). According to Oluwatayo (2014), age, gender, level of education, major occupation, household size, amount of remittances received, and extension services had a significant effect on the poverty status of the respondents. Obisesan (2013) examined the access of small farmers to credit and founded the significant determinants of credit accessibility as gender, age, main occupation, participation in off-farm activities, membership of farmers' association and crop yield. Apata *et al*. (2010) studied the determinants of rural poverty of small farmers in Nigeria and found that access to micro-credit, education, participation in agricultural workshops/seminars, livestock assets, and access to extension services significantly influenced the probability of households' existing chronic poverty. The findings of Bogale (2011) stated that poverty is location specific depending on access to irrigated land and access to non-farm income. However, this study also indicated that household wellbeing was negatively affected by household size, and positively affected by age of household head. Also, involvement in governance, social and production related networks are also found to be strongly associated with the probability of a household being poor. All these researches show that the poverty among small farmers was affected by the socio-demographic factors, access to extension services and credit, social and production related networks with governance.

The majority of people in absolute poverty have lived on small farms. Practices to reduce the poverty of small farms, which are the most disadvantaged group in terms of poverty, are of great importance. The aim of this study was to calculate poverty in the smallholder farms and to determine its affecting factors in the central district of Hatay province, Turkey.

Material and method

Material

The research was conducted in the central district of Hatay province of Turkey in 2018. The UNCTAD (2015) classified smallholdings as the farms with a low asset base and operating in less than 20 decares of farmland. The data of the study were collected by questionnaire from 73 small farmers who have 20 decares or smaller land sizes.

Method

Measuring of poverty

Poverty measures fall under two broad categories: those that examine poverty either in absolute or in relative terms (El-Osta & Morehart, 2008). Absolute measures of poverty compare household income with the cost of a basket of specific goods and services. Relative measure of poverty compares household income and spending patterns with income and spending patterns of the general population (El-Osta & Morehart, 2008). In the study, HCR and PGI were used to measure relative poverty. HCR is calculated as the ratio of the population below the poverty line to the total population. After the income of each poor is subtracted from the poverty line value, it is obtained by adding the obtained values and dividing them by the number of poor people. HCR gives information about the poverty deficit and the degree of poverty. HCR is the ratio of the number of people whose income falls below the poverty line to the population and it is expressed as follows (Ravallion, 1992);

$$H = \frac{q}{n}$$

Where H= Headcount ratio (Poverty incidence)
q= Number of poor smallholder farmers
n= Total number of smallholder farmers

The PGI is equal to the ratio of the average poverty gap to the poverty line in society. PGI usually measures poverty depth (Mbanasor *et al*. 2013) and in this study, the following formula was adopted (Ravallion, 1992);

$$I = \left[\frac{Z - Y}{Z}\right]$$

Where I = Poverty gap
Z= Poverty line estimated using median equivalence of household income
Y=Median income of the poor smallholder farmers

Fifty percent of the median income was taken to calculate the poverty line (OECD, 2018). As households are of different sizes and components, they should be standardized with the help of an equivalent person scale. OECD equivalence scale was used for the equivalent person scale. This scale assigns a value of 1 to the household head, of 0.5 to each additional adult member and of 0.3 to each child. The t-test was used to compare the means and the chi-square test was used to compare the groups.

Logit Model

In the study, the logit model was used to analyse the factors affecting poverty. The Logit model is expressed as follows (Gujarati, 1995):

$$P_i = F(Z_i) = F\ (\alpha + \beta X_i) = \frac{1}{1+ exp^{-(z_i)}} = \frac{1}{1+ exp^{-(\alpha+\beta x_i)}} \quad (1)$$

P_i is the probability of i[th] household to select a specific choice, F is probability function, α is constant coefficient, $Z_i = \alpha + \beta X_i$, where β is the estimation of parameters for each explanatory variable, X_i represents i[th] independent variable. The equation below has been found by rearranging Equation 1 and finding the natural logarithm of both sides of the equation;

$$L_i = Ln\left[\frac{P_i}{(1-P_i}\right] = Z_i = \alpha + \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots \beta_n X_n + \varepsilon_i \quad (2)$$

Marginal probability calculates the variation in the probability of poverty in accordance with the change in each explanatory variable (Greene, 2011). The estimated β-coefficients of Equation 2 do not directly represent the marginal effects of the independent variables on the probability P_i. In the case of a continuous explanatory variable, the marginal effect of X_j on the probability P_i is given by:

$$\frac{\partial P_i}{x_{ij}} = \frac{\left|\beta_j \ \exp(-\beta X_i)\right|}{|1 + \exp(-\beta X_i)|^2} \quad (3)$$

However, if the explanatory variable is qualitative or discrete in nature $\partial P_i / \partial X_{ij}$ do not exist. In such a case, the marginal effect is obtained by evaluating P_i at the alternative values of X_{ij}. For example, in the case of a binary explanatory variable X_{ij} that takes values of 1 and 0, the marginal effect is determined as:

$$\frac{\partial P_i}{x_{ij}} = P\left(X_{ij}\right) = 1 - P\left(X_{ij}\right) = 0 \quad (4)$$

The dependent variable in the study was taken as 1 for small farmer households living under the poverty line and 0 for households living above the poverty line. Factors affecting poverty in small farms are given in Table 1.

Table 1. Variables used in Logit model

The dependent variable	
POVERTY	**Poverty (1=Poor farm 0=Non-poor farm)**
The independent variables	
AGE	Age (year)
GENDER	Gender (1=Male 0= Female)
EDUCA	Education (Elementary school and above=1 other= 0)
SOCSEC	Social security (1=Yes 0= No)
EQUIVASIZ	Household equivalent size (Person)
LANDSIZE	Land size (Decares)
MEMUNION	Membership to the farmer organizations (%) (1=Yes 0= No)
RETIRE	Retirement (1=Yes 0= No)

Results and discussion

Socioeconomic and Structural Characteristics of Smallholder Farmers

According to the general level of society, individuals or households who have income or expenditure below a certain limit are considered to be relatively poor. Poor and non-poor farmers were defined by their annual incomes. Thirteen farmers living under the poverty line of ₺3740.9 were considered as poor and 60 farmers living above the poverty line were regarded as non-poor. The average age of the householders was 51.1 years old, 52.7% of the interviewees were women. It was also revealed that 41% of poor farmers and 30% of non-poor farmers have less than elementary education. Besides, 79.1% of farmers were married, 28.4% of the participants were retired, 69.3% of the participants had social security and the average household size was 4 people. Equivalent size can be calculated for the different consumption needs of adults and children in households and standardizes the number of family members. In the study, the equivalent household size was found to be 2.4 persons on average. According to the results of the survey, the most important income source for 72.6% of the households was agriculture and the average agricultural experience was 23.5 years. Maintaining physical or financial records in the farms is of great importance for controlling the management of the farms. As for the physical and financial records, while none of the poor farms hold any records, 6.2% of non-poor farms hold this kind of records. In addition, only 33.3% of the total income of the poor farms came from agriculture. Non-poor farms earned 43.2% of their total income from agriculture (Table 2). The results of the study showed that there were statistically significant differences between the poor farms and non-poor farms in terms of household size, the household equivalent size, membership to the producer organization, land size, total income, agricultural income, and non-farm income.

Table 2. Socioeconomic and Structural Characteristics of Smallholder Farmers

	Poor Farms (13)		**Non-poor Farms (60)**		**All Farms (73)**	
	Mean	**Std. Dev.**	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**
Age *(year)*	54.2	8.9	50.6	11.5	51.1	11.2
Gender *(%)*	38.0	-	54.7	-	52.7	-
Education						
Less than elementary school (%)	41.0	-	30.1	-	32.1	-
Elementary school (%)	59.0	-	51.0	-	53.3	-
Secondary school (%)	-	-	9.1	-	7.2	-
High school (%)	-	-	5.6	-	4.1	-
University (%)	-	-	4.2	-	3.3	-
Marital status (%)	80.3	-	78.5	-	79.1	-
Retired *(%)*	13.3	-	30.4	-	28.4	-
Social security *(%)*	40.0	-	73.0	-	69.3	-
Household size *(person)**	5.5	2.2	3,7	1.8	4.0	2.0
Household equivalent size *(person)**	3.1	1.0	2,2	0.8	2.4	0.9
Main profession as farmer *(%)*	70.0	-	73.1	-	72.6	-
Experience on agriculture *(year)*	25.8	16.5	23.5	15.8	23.5	15.9
Record Keeping *(%)*	-	-	6.2	-	5.5	-
Membership to the farmer organizations *(%)* ***	16.2	-	65.0	-	39.7	-
Land size *(decare)**	1.3	1.1	4.8	4.0	4.3	3.8
Number of parcels *(unit)*	1.4	0.8	2.1	1.3	2.0	1.2
Credit use *(%)*	-	-	12.0	-	10.5	-
Total income *(₺/year)**[1]	6382.9	3996.0	21619.8	12392.0	18962.2	12763.9
Agricultural income *(₺/year)**	2126.9	2650.4	9340.7	9122.7	8082.5	8790.7
Non-farm income *(₺/year)**	4256.0	3539.1	12279.1	7503.6	10879.7	7603.2

** and *** indicate that the difference between the means are statistically significant at the level of 1 and 10%, respectively*

[1] *$1 equal ₺ 3.76 (TRCB, 2018)*

Determination of the Poverty Line and Gap in Smallholder Farmers

In this study, the average and the median income per equivalent person were found as ₺8884.7 and ₺7405.5, respectively. The median income per farm was ₺15897.5. The poverty line is the determination of a monetary amount to meet basic needs (Oztornaci & Demirdogen, 2015). The

poverty line was ₺3740.9 and 13 farms were determined below the poverty line. In Turkey, the poverty line for the rural areas was ₺3724, while the poverty rate and gap were 14.3% and 0.22% in 2013 (TurkStat, 2018). In this study, the HCR was calculated as 17.8%, which means that 17.8% of small farmers were poor. The poverty gap was calculated as 49%, indicating that the income of small farmers under the poverty line should be increased by at least 49%. The poverty rate and deficit in the small farms were found by Bogale (2011) as 35.6% and 9.1%, respectively. The poverty rate and deficit in the study of Ike and Oboh (2009) were found as 50.6% and 28%, respectively. Mbanasor *et al*. (2013) found a higher poverty rate (56%) and deficit (56.8%) However, Kan (2012) found that less poverty rate (17.86%) and the poverty gap (29%) in Turkey (Table 3).

Table 3. Estimates of Poverty Line, Gap and Incidence in Family Farm

Variables	Estimates
Average income per equivalent person (₺)	8884.7
Median income per equivalent person (₺)	7405.5
Median income per farm (₺)	15897.5
Poverty line	3740.9
Number of families under poverty line (unit)	13.0
HCR (Poverty Incidence) (%)	17.8
Poverty Gap (%)	49.0

Logit model results

The factors affecting the poverty of smallholder farmers are presented with the logit model. The likelihood ratio test shows a good fit for the model ($P < 0.001$). Among the variables included in the Logit model, the variable of the households' equivalent size, land size, retirement status, and social security status were found to be statistically significant at the level of 1%, 5%, and 10%, respectively.

The results of this research stressed that the most important factor affecting poverty is the retirement status of the farm householder. The retirement of the farm householder reduces the probability of households to be poor by 24.1%. In order to reduce poverty in the smallholder farmers, the government should give social aids to non-retired smallholder farmers and they encourage them to work part time non-farm business. Vatta and Sidhu (2010) also emphasized that non-agricultural income is an important factor in reducing poverty.

Another important factor reducing poverty is the social security situation of farmers. Social security is a set of policies and systems that protects individuals against occupational, physiological and socio-economic risks in their life. According to the results of the study, the probability of households with social security being poor reduces by 14.8% on average.

The household equivalent size was determined as another factor affecting poverty. Our study shows that when households' equivalent size increases by 1, the probability of being poor increases by 12.3%. The average number of households in rural areas is higher than in urban areas. Population growth in rural areas through family planning as government policy was determined as one of the measures to reduce poverty. Bogale (2011) stated also that increasing households' equivalent size will exacerbate extremely poor and moderately poor poverty. It has been found that increasing the number of households negatively affects poverty (Oluwatayo, 2014; Vatta & Sidhu, 2010).

The land is an important factor to reduce poverty. In our study, it was revealed that the increase in land size by 1 decare reduced poverty by 6.1%. Thus, it might be suggested that the size of the land should be increased to reduce the poverty of smallholder farmers. It has been supported by various studies that poverty could be decreased by increasing land (Apata *et al*., 2010; Vatta & Sidhu, 2010).

Gender is another important variable that affects poverty. In the study, it was found that being male farm manager decreases the probability of being poor by 9.8%. Oluwatayo (2014), Apata *et al*. (2010) and El-Osta and Morehart (2004) found similar results.

Education and organization in agriculture are of great importance in the adoption of innovations and cooperation. Thus, it was determined that the education level at least higher than elementary school reduced the probability of being poor by 8.9%, and membership of agricultural organizations reduced the probability of being poor by 8.7%. Apata *et al*. (2010) and El-Osta and Morehart (2004) found similar results which stated that education and organization reduce poverty

The population aging phenomenon of the transformation process also affects the rural population in Turkey. Urbanization, migration from rural to urban areas, and the elderly population remain predominantly in rural areas are among the main socioeconomic problems. It has been shown that increase in the age of householder by 1 year increases the probability of being poor by 0.1%. Oluwatayo (2014) found similar findings in their study, while Apata *et al*. (2010) found that age reduces poverty.

Table 4. Logit Model Results

Explanatory variables	Coefficient	Standard Error	P	Marginal effects
INTERCEPT	-0.072	4.037	0.985	-
AGE	0.018	0.063	0.771	0.002
GENDER	-1.174	1.092	0.282	-0.098
EDUCA	-1.064	1.047	0.309	-0.089
SOCSEC	-1.770	0.911	0.052	-0.148
EQUIVASIZ	1.479	0.527	0.005	0.124
LANDSIZE	-0.728	0.354	0.039	-0.061
MEMUNION	-1.050	1.107	0.343	-0.088
RETIRE	-2.882	1.359	0.034	-0.242
Number of observations	*73*			
Loglikelihood	*-23.151*			
χ^2	*0.001*			
Pseudo R^2	*0.418*			

Conclusions and Recommendations

Poverty is one of the main problems facing the world, especially the underdeveloped and developing countries. Especially the people in rural areas have suffered more from poverty due to their low value-added products. Developing new methods to combat rural poverty and increasing the works in this field are of great importance in reducing poverty.

According to the results of the research, the median income is below the average income which indicates the existence of income distribution inequality. The poverty line for farms was calculated as ₺3740.9 and it was founded that 17.8% of the producers lived below the poverty line. In addition, the poverty gap for the poor farmers was found as 49% and it was understood that the producers had to increase their income at least twice to get out of poverty.

The logit model concluded that age and the household equivalent size had an increasing effect on poverty, while gender, education, social security, land size, membership to producer organizations and retirement had a reducing effect on poverty. The most effective factors on poverty were the retirement status, social security situation, and household equivalent size, respectively. There are significant differences between the characteristics of the poor farmers and non-poor farmers in terms of education, retirement, social security, membership in cooperatives, land size and credit utilization. Elimination of these differences could play an important role in reducing poverty.

In the light of the conclusions of the study, it is recommended that policies such as increasing the education level of smallholder farmers through non-formal education, promoting social security and finding non-farm part time works, and allocating idle land to smallholder farmers can play an important role in reducing rural poverty. Policymakers should take efficient precautions to get social fairness in the mid-run and long-run to guide and reduce poverty among smallholder farmers.

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