



## A Case Study on the Risk of Rural Poverty in Semi-Arid Region of Turkey: Kırıkkale Province Central District

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**Abstract:** The aim of this research is to determine the risk of rural poverty of farms located in semi-arid regions of Turkey. To reach the aim, it was selected that representing semi-arid areas as Kırıkkale province in Central Anatolia region. The bulk of the data was collected from selected farms by questionnaires which were selected from farms in the research area by random sampling method. The risk analysis was made by simulation of stochastic values of obtained income (Gross Agricultural Income and Total Family Income). According to research results, the average farm land was 89.59 decares. 95.16% of crop land was arid land and mainly, engaged in cereal production. Besides crop production, animal husbandry was done in the average as 2 head dairy cow, 2.19 head cow, 13.03 head sheep and 1.45 head goat. Gross Agricultural Income was \$4988 in the average farm and 70.98% of them were from crop production, 29.02% was from animal production. Total Family Income was \$5565. It was found that the risk of rural poverty was 26.66% as to obtained Gross Agricultural Income and 17.29% as to Total Family Income.

**Key Words:** Rural poverty, risk, sustainable agriculture, economic analysis, income.

### Türkiye’de Yarı-Kurak Bölgelerde Kırsal Fakirlik Riski Üzerine Bir Araştırma: Kırıkkale ili Merkez ilçesi

**Öz:** Bu çalışmanın amacı Türkiye’de yarı-kurak bölgelerde bulunan tarım işletmelerinde kırsal fakirlik riskini belirlemektir. Bu amaca ulaşmak için İç Anadolu Bölgesi’nde yer alan Kırıkkale ili yarı kurak alanları temsil eden il olarak seçilmiştir. Çalışmada kullanılan veriler basit tesadüfi örnekleme yöntemi ile seçilen işletmelerden anket yoluyla toplanmıştır. Risk analizi, işletmelerde elde edilen gelirin (Brüt Tarımsal Gelir ve Toplam Aile Geliri) stokastik değerlerinin simülasyonu yoluyla yapılmıştır. Araştırma sonuçlarına göre incelenen işletmelerde ortalama işletme büyüklüğü 89.59 dekadır. Tarla arazisinin %95.16’sı kuru tarım arazisi olup tahıl üretimi ile uğraşmaktadır. İşletmelerde bitkisel üretim yanında hayvancılık da yapılmakta olup, işletmeler ortalamasında 2 baş süt ineği, 2.19 baş besi sığırı, 13.03 baş koyun ve 1.45 baş keçi bulunmaktadır. Brüt Tarımsal Gelir 4988\$ olup bunun %70.98’i bitkisel üretime %29.02’si ise hayvansal üretime aittir. Toplam Aile Geliri 5565\$ olarak bulunmuştur. Kırsal fakirlik riski işletmelerin Brüt Tarımsal Geliri dikkate alındığında %26.66, Toplam Aile Geliri dikkate alındığında ise %17.29 olarak bulunmuştur.

**Anahtar Kelimeler:** Kırsal fakirlik, risk, sürdürülebilir tarım, ekonomik analiz, gelir.

#### Introduction

Poverty can be defined as the lack or the inability to achieve a socially acceptable standard of living (Anonymous 2008a). In the global assessment it is accepted that person whose income less than \$1 a day is poor (Anonymous 2001b). Of the world's 6 billion people, 1.2 billion live on income less than \$1 a day (Anonymous 2001a). Some three quarters of the poor live in rural areas and depend primarily on agriculture and related activities for their livelihood. The majority of the rural poor live in areas that are resource-poor,

highly heterogeneous and risk prone. Their agricultural systems are small scale, complex and diverse. The worst poverty is often located in arid or semi-arid zones (Anonymous 2001b, Dar et al. 2003, Shiferaw 2006). Because degradation of the natural resource base, coupled with high rates of population growth and food insecurity, is a major development problem in the semi-arid rainfed areas. According to World Bank, of the total poor, about 38% were found in arid and semi-arid regions (Shiferaw 2006)

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In semi-arid regions rainfed agriculture is coping with unreliable rainfall and recurrent droughts with subsequent production failures. Although irrigation plays an important role in food production, the possibilities of further extension seem to be limited since water resources of sufficient quality become scarce or too expensive to use (Anonymous 2008d).

Although Turkey is located in Mediterranean basin disaggregated into 7 geographical regions, each region has different characteristics in terms of climate and geographical conditions. The region of Central Anatolia with continental climate and average 500 mm/year rainfall (Anonymous 2008b) has semi-arid region characteristics. Agriculture is mostly depend on rainfall and fall mostly in winter months. Generally cereal farming is common in semi-arid regions. Because of the low precipitation, each year at least one third of the crop land is left as fallow land.

The main characteristic of semi-arid farms in Turkey is to be small scale family farm, extensive production and mixed crop system with rotation. They have also kept livestock for animal food necessity of family. The production from agriculture is separated firstly for family consumption and the rest of them is marketed.

The aim of this research is to determine the risk of rural poverty of farms located in semi-arid regions of Turkey.

### Material and Method

To determine the risk of rural poverty of farms in semi-arid regions of Turkey, it was selected that representing semi-arid areas as Kırıkkale province in Central Anatolia Region. With the help of the staff who were working in the Agricultural Directorate of the Ministry of Agriculture and Rural Affairs in Kırıkkale province it was determined that Central district was represent Kırıkkale province and 3 villages (Ulaş, Pazarcık, Yukarımahmutlar) were represented Central district by agricultural structure, natural conditions and production techniques. The average temperature is 24.1 °C in summer and -1.8 °C in winter, precipitation is 330 mm and humidity is 59% in Kırıkkale province. Of the total area sown, 68% is belonging to wheat, 20% is barley and rest of them is legumes, oilseeds, industrial crops and vegetables (Anonymous 2008c).

Since there is no farm accounting system in Turkey, data were collected by survey. The bulk of the data used to reach the aim was collected from 31 farms by questionnaires which were selected from

farms in the research area by random sampling method.

In economic analysis of farms, Gross Production Value (GPV), Gross Agricultural Income(GAI) and Variable Costs were calculated. GPV was obtained by multiplying total production with producer price. GAI was calculated by subtracting variable cost from GPV. Total Family Income (TFI) was calculated by adding nonagricultural income to the GAI.

The risk analysis was made by simulation of stochastic values of obtained incomes (GAI and TFI). The stochastic values were calculated by GRK distribution and simulated using simetar computer program (Richardson 2003, Bowker and Richardson 1989, Ray et al. 1998).

### Results

The main characteristic of selected farms was small family farms. Farm labor was met from family labor especially active population. The male population was 2.4(±1.1), female population was 2.2(±0.9) and total population was 4.5(±1.7) in the studied farms. 12.77% of them was 0-6 age group, 16.3% was 7-14 age group, 66.0% was 15-49 age group, 5.0% of them was 50 and above age group. So, the active population (15-49 age group) has the highest percentage as 66.0%.

As seen Table 1, crop production activity was mainly done in arid land. The average farm land was 89.59 decares, 96.7% of them crop land, 2.5% was vegetable, 0.7% was fruit garden and 0.1% was vineyard area. Arid land had the highest percentage in crop land as 95.16%. Only 4.84% of crop land was irrigated.

Selected farms were, mainly, engaged in cereal production in terms of crop production (see table-1). As a matter of fact, 60% of farm land was allocated to wheat and barley production. Fallow land was 39.65% because of the arid region necessity. Besides crop production, animal husbandry was done in selected farms in the average as 2 head dairy cow, 2.19 head cow, 13.03 head sheep and 1.45 head goat (Table 1).

As seen at the Table 2, Gross Agricultural Income was \$4988 in the average farm and 70.98% of them were from crop production, 29.02% was from animal production. In the selected farms non agricultural income was also obtained as \$577 in the average. Total Family Income was found by adding Non Agricultural Income to the Gross Agricultural Income as \$5565. It was determined that the adequate

income for farms was 2740\$ in 1984 in Turkey according to law 3083, Agricultural Reform on Regulations for Irrigated Land, published in Official Newspaper in December 1st, 1984. This income was calculated as 2300\$ for 2001 year when it was

calculated with wholesale price index for Turkey. According to this, both Gross Agricultural Income and Total Family Income were above sufficient income level. So, it could be said that obtained income was sufficient at the average farm.

Table 1. The land, crop pattern and livestock of farms

Production activity	Unit	Area	%	%
<b>Irrigated Land</b>	<b>Decar*</b>	<b>4.19</b>		<b>4.84</b>
- Wheat (Irr.)	Decar	2.81		3.24
- Barley (Irr.)	Decar	0.90		1.04
- Sugarbeat (Irr.)	Decar	0.48		0.55
<b>Arid land</b>	<b>Decar</b>	<b>82.45</b>		<b>95.16</b>
- Wheat (Arid)		44.42		51.27
- Barley (Arid)	Decar	3.45		3.98
- Sunflower (Arid)	Decar	2.58		2.98
- Melon (Arid)	Decar	3.71		4.28
- Fallow	Decar	28.29		32.65
<b>Total crop land</b>	<b>Decar</b>	<b>86.64</b>	<b>96.70</b>	<b>100.00</b>
<b>Vegetable land</b>	<b>Decar</b>	<b>2.23</b>	<b>2.49</b>	<b>100.00</b>
- Green beans	Decar	1.04		46.64
- Tomatoes	Decar	0.59		26.46
- Cucumber	Decar	0.31		13.90
- Other vegetable	Decar	0.29		13.00
<b>Fruit</b>	<b>Decar</b>	<b>0.61</b>	<b>0.68</b>	
<b>Vineyard</b>	<b>Decar</b>	<b>0.11</b>	<b>0.23</b>	
<b>Total area</b>	<b>Decar</b>	<b>89.59</b>	<b>100.00</b>	
Dairy	Head	2		
Cow	Head	2.19		
Sheep	Head	13.03		
Goat	Head	1.45		

\*: One decar (da) is 1/10 of one hectare.

Table 2. Agricultural and family income

	\$	%
Gross production value	7,539	100.00
- Crop production	4,314	57.22
- Animal production	3,225	42.78
Variable cost	2,551	100.00
- Crop production	774	30.33
- Animal production	1,778	69.67
<b>Gross agricultural income</b>	<b>4,988</b>	<b>100.00</b>
- Crop production	3,540	70.98
- Animal production	1,448	29.02
Non agr. Income	577	
<b>Total family income</b>	<b>5,565</b>	

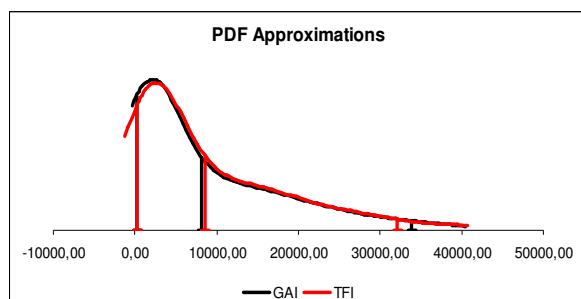


Figure 1. PDF Approximation of GAI and TFI

To determine the risk of rural poverty, calculated deterministic Gross Agricultural Income and Total Family Income were transformed to stochastic values by Monte Carlo procedure (Richardson 2003). Then these stochastic values were simulated and results were given at Figure 1 and Table 3. According to simulation results, simulated Gross Agricultural Income was 8191\$ and simulated Total Family Income was 8595\$ and these values were significant as to 95% significant level (t-values 2.28). But the probability of obtaining income was not distributed normally as seen in the Figure 1. While the probability of obtaining income more than 10000\$ was 31%, 2% of farms could have get zero profit or loss.

Simulated Gross Agricultural Income and Total Family Income was above than sufficient income (2300\$) that was adequate to subsist.

According to the research results, the risk of obtaining income less than sufficient for living was 47.23% in the selected farms when taken into consideration only agricultural income (GAI). Since nonagricultural income was also obtained, calculations were made as to Total Family Income. When Total Family Income was taken into consideration, the risk of obtaining less than sufficient income was 31.46%.

According to World Bank, the people have been living in poverty earned less than \$1 a day (Anonymous 2001a). In the selected farms, average population was 4.5 in the household. Thus, the income below poverty was calculated by multiplying average population and 1\$/day and compared with simulated obtained income. As seen Table 4, it was determined that the risk of rural poverty 26.66% for obtained Gross Agricultural Income and 17.29% for Total Family Income (Table 4).

Table 3. The simulated income

	\$	more than \$10000	less than 0
Simulated gross agricultural income	8191	30.52	2.26
Simulated total family income	8595	31.71	2.00

Table 4. Probability of obtaining less than sufficient income and the risk of rural poverty %

	Gross Agricultural Income	Total Family Income
Less than sufficient income	47.23	31.46
The risk of rural poverty	26.66	17.29

### Conclusion

The farms in semi-arid region have the risk of facing with rural poverty. Because agricultural production is mainly depend on rainfall in the small scale family farms. In semi-arid regions with rainfed agriculture farmers has more uncertainty than other regions. The droughts or floods can cause production loss and this effects farm income. The aim of this research is to determine the risk of rural poverty of farms located in semi-arid regions of Turkey. According to research results it was found that Gross Agricultural Income was \$4988 in the average. They were mixed farms engaging both crop production and livestock activities. Of Gross Agricultural Income 70.98% was from crop production, 29.02% was from animal production. In the studied semi-arid farms non agricultural income was also obtained as \$577 in the average. Total family income was found by adding Non Agricultural income to the Gross Agricultural Income as \$5565. And these were sufficient to substance. The risk of obtaining less than sufficient income for living was 47.23% as to Gross Agricultural Income (GAI) and 31.46% as to Total Family Income. It was determined that the risk of rural poverty 26.66% obtaining Gross Agricultural Income and 17.29% for Total Family Income.

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