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A Case Study on Economic Classification of Small Ruminant Farms in Turkey

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Abstract: Livestock farming in Turkey is generally small-scale family enterprise, carried out in the vast majority of cases. There are 25 million small ruminants in Turkey and it is an important income resource of farms. Approximately, one third of national flock (33 %) is located in South Eastern Anatolia region. In this study, it was determined that the economic size of small ruminant farms in Sanliurfa province of Southeastern Anatolia Region of Turkey, which has the 14.6% of small ruminant number of the region and compared with EU small ruminant farms. The data, which was used in this study obtained from survey result, which was conducted by researches in Sanliurfa province and Farm Data Network System (FADN) in Europen Union (EU). According to research results, average economic size of the farms is 7.61 ESU. The ESU values of the 55% of the EU farms and 93% of the studied farms are smaller than 16 ESU. Other important differences between the studied farms and EU farms are land size and the differences between farm gross margins resulting from subsidies.

Key words: FADN, gross margin, farm records, agricultural accounting, sheep, goat

INTRODUCTION

Turkey is making headway in her efforts to ensure adaptation in various topics to EU in the full accession process. Both the importance in the economy and socio-economical conditions make agriculture the leading sector. On the other hand, Turkish agriculture will likely encounter difficulties in adaptation to the EU since different structural characteristics from EU countries.

The EU has undergone a number of enlargements since its foundation. Agriculture and CAP (Common Agricultural Policy) have become the most common discussed topics within the Union. Therefore, comparisons of structural and economic data of the member countries are always an important issue for the Union.

Although, all member countries have their own data systems, it has been a necessity to collect data in the same basis to shape the CAP and to compare farms of all member countries. The Farm Accountancy Data Network (FADN) is an instrument for evaluating the income of agricultural holdings and the impacts of the Common Agricultural Policy (European Commission, 2001).

FADN was launched in 1965 with the Council Regulation 79/65 and established the legal basis for the organization of the network. It consists of an annual survey carried out by the Member States of the European Union. It is collected every year accountancy data from a sample farms in the European Union. These data make it possible to compare the specialized farms of the member countries, regions and changes that emerge in time and evaluate, review and improve agricultural policies (EU Commission, 2002; Rehber, 1996; Rehber *et al*., 2002; BMVEL, 2005; Haering and Offermann, 2005).

Since, Turkey will be included in this process when she becomes a full member of the Union, Turkey, as a candidate country that willingly endeavors for full accession, should also have a data acquiring system that is established based on a common terminology and that provides a common comparison basis.

To this end, TURKSTAT (Turkish Statistical Institute) implemented a pilot study in the Aegean Region in 1999, which was followed by a Turkey-wide study. In addition to these studies, there are some academic studies such as specialized grain farms in the Konya province and farms in the Bursa province (Rehber *et al*., 2002; Gundogmus, 2000; Turkstat, 1999; Keskin, 2003).

There are 25 million small ruminants in Turkey and itis an important income resource offarms. Approximately, one third of national flock (33%) is located in South Eastern Anatolia region (Turkstat, 2007). The province of Sanliurfa is in this region has the 14.6% of

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small ruminant number of the region and the 32.5% of the livestock. It is the 5th of the most important provinces in Turkey as 5% in terms of small ruminant production.

The aim of this study, is to make a pilot study on classify Turkish farms according to the EU system, considering small ruminant farms in Sanliurfa province and compare EU small ruminant farms.

MATERIALS AND METHODS

Sampling and data collection: In this study, small ruminant farms in the Sanliurfa province located in the South Eastern Anatolia Region are selected as the research area. The main data were collected from sheep and goat farms in research area by questionnaire. The secondary data was collected from related publications and statistics such as Turkish Statistical Institute, Ministry of Agriculture and Rural Affairs and other related organizations. The data related EU farms were downloaded from Eurostat and FADN internet web sites.

The farms, which have 20 and more heads of small ruminants and which meet the 1 ESU base value, have been considered and therefore, a total of 73 farms in the 12 villages selected by sampling formula from districts (Central, Ceylanpinar, Siverek and Viransehir) of the Sanliurfa Province The questionnaires were prepared and filled in by the researchers through face to face survey. The farms, land assets, labor force, Standard Gross Margin (SGM) in crop and livestock production and farm sizes have been calculated.

Criteria of comparison and calculation: Standard Gross Margin (SGM) expresses average gross margin for each agricultural production in a certain region (Kiral and Tatlidil, 1996; Rehber, 1996; Keskin, 2004; Eurostat, 2006). In the EU methodology, the SGM is calculated through 3-year averages in order to remove various extreme effects (European Commission, 2002; Polski, 2004). In Turkey, however, Since there is no agricultural record in farms, it is not possible to access past year's data on a per farm basis. Therefore, the study was carried out based on 1 year data and the SGM values were calculated for each production activity as follows:

- Standard Gross Margin (SGM) = Gross production value of each production branch-specific variable costs of production branches.
- Gross Production Value (GPV) = Main product value + Byproduct value.
- Main product value = Base production × farm gate price.
- Byproduct value = Byproduction × farm gate price.

In order, to classify farms according to their economic size (ESU) based on the EU methodology, the following steps have been followed (European Commission, 2007).

- Current branches of production in the farms have been identified.
- Scopes of each branch of production (ha and number of animals) have been identified.
- Each of the branches of production has been multiplied with calculated standard gross margin to determine standard gross margin of the farm.
- Total standard gross margins of the farms have been calculated by summing up gross margins calculated for each of the branches of production.
- Economic sizes of the farms have been calculated by dividing a farm's total gross margin by ESU (1ESU = 1200 ECU).

After determining farms' economic size, the share of farm land assets, livestock assets and livestock activity in the total SGM have been determined for each farm that falls under a certain size class.

Finally, EU farms have been compared with the structural indicators, gross farm income, small ruminant income and total production values of the studied farms. The equations used in the calculations related with farm income are below (European Commission, 2001; European Commission, 2007a):

SE131 (Total production) = SE135 (crop production + SE206 (livestock production) SE256 (others).

SE410 (gross farm income) = SE131-SE275 (specific costs and farm costs) + SE600 (current supports).

SE230 = Sheep and goat meat.

SE245 = Sheep and goat milk.

In the FADN system, supports are also added to the farm income. Therefore, comparisons have been performed according to subsidized and unsubsidized gross farm incomes.

RESULTS

Population and Average Work Unit (AWU) of farms: The average population in the studied farms is 9.66. Labor force is 4.33 AWU. Most of the labor force consists of the 15-49 age groups. The share of this age group in the total AWU is 69% (Table 1).

Land assets and tenure: The average farm land of the studied farms is 11.3 ha, 8.8 ha of which are owned land in

Table 1: Average population and AWU

Age groups	Male	Female	Total	AWU[1]
0-6	0.65	0.74	1.39	-
7-14	1.20	1.52	2.72	0.22[2]
15-49	2.61	2.15	4.76	3.69[3]
50+	0.45	0.34	0.79	0.42[4]
Total	4.91	4.75	9.66	4.33

[1]AWU (Annual Work Unit) = 2200 h (4.11). [2]They are assumed to work half a day for 3 months annually. [3]Female labor force are assumed to work for 2/3 of the work time. [4]Female labor force are assumed to work for 1/3 of the work time

Table 2: Technical coefficients and the share of sheep and goat production in milk production value

	Economic life (years)	Birth rate (%)	Mortality rate (%)	Pasture time (months)	Milking time (days)	Number of daily milking	Milk production in lactation period (kg)	Average number of animals	Milk income ratio (%)
Cattle	6.70	94.00	14.00	6.70	175	2	875	1.30	10.14
Sheep	6.30	97.00	12.60	7.50	125	2	79	69.25	70.47
Goat	6.40	106.00	13.90	7.40	135	2	116	11.45	19.39
Total						-	-	-	100.00

Table 3: Standard gross margins in crop and livestock production

Products	(Euro/Head)
Wheat (irrigated)	377
Wheat (dry)	181
Barley (irrigated)	318
Barley (dry)	118
Lentils (irrigated)	89
Lentils (dry)	33
Chickpea	241
Cotton	656
Olive	540
Peanut	839
Cow	500
Sheep	71
Goat	66

[1]ECU = 576,000 TL

the average. Thirty percent of the farms are landless and land assets of 48% are lower than the average of the Turkey. Ninety five percent of farm land are crop land 3% is horticulture land and 2% is vineyard and vegetable area. The average size of irrigated land is 2.6 ha and land used under lease or shared lands is 2.5 ha.

In the farms, vegetable production is performed only for household consumption in very small area. Sixty two percent of the farms produce wheat, 56% produces barley, 25% produce lentils and 15% produce chickpea. Perennial crop is present in about 12% of the farms. The average size of wheat area is 3.0 ha, 2.3 ha for barley, 1.2 ha for lentils, 1.1 ha for chickpea and 0.3 ha for cotton. Twenty seven percent of wheat, 24% of barley and 38% of chickpea is produced in irrigated lands.

Livestock assets: The average number of milking animals in the farms and the share of the income obtained from milk are shown in Table 2. Accordingly, the shares of sheep, goat and cattle milk in the total milk income are 70, 19 and 10%, respectively (Table 2).

The livestock assets of farms in terms of average Large Animal Unit (LAU) is approximately 19. Small ruminant assets in farms are 15.43 in terms of LAU in the average and this amount comprises 83% of total the LAU.

The average livestock assets of farms intensify between 6-10 LAU with a rate of 27% and the farms that have 0-5 LAU comprise 15% of total farms. The farms that have 36 and more LAU comprise 8% of total farms.

In the 52% of the farms, small ruminant assets are lower than 10 LAU.

Standard gross margins: Gross production values produced in each farm and variable costs related with this production activity are calculated in the study. Standard Gross Margin for each product is calculated by dividing the difference between gross production value and variable costs by 1 ha/head.

The calculated SGM per ha for crop production and per head for livestock production are given in Table 3. Peanut and cotton provide the highest gross margins in crop production. In livestock production, on the other hand, SGM for cattle, sheep and goat are calculated as 500 Euros, 71 Euros and 66 Euros, respectively (Table 3).

Distribution of farms according to economic size: SGM calculated depending on the data acquired from the farms and given in Table 3 are also, used for calculating total gross margins of the same farms. Economic sizes of farms are calculated by converting total gross margins for each farm to ECU (1 ECU = 576.000 TL) by using the foreign exchange rates for the study period and finally by dividing this value by 1 ESU (European Size Unit) value (1 ESU = 1200).

Accordingly, in Sanliurfa 34% of the farms, in which livestock production activity is mainly performed, are very

Table 4: Land sizes, livestock assets and population as to farm size

Size (ESU)	Number of Farms (units)	Land size	Livestock assets (CU)	Sheep + goats (CU)	Share of livestock production (%)	Population		
						Male	Female	Total
<4 ESU	25	9.26	7.53	5.41	83.00	4.16	4.52	8.63
4≤8 ESU	23	5.13	16.65	12.35	90.00	4.96	4.17	9.13
8≤16 ESU	20	10.74	24.84	21.08	76.00	5.30	4.50	9.80
16≤40 ESU	5	15.99	57.42	57.02	81.00	7.20	9.60	16.80
40≤100 ESU	0	-	-	-	-	-	-	-
≥100 ESU	0	-	-	-	-	-	-	-

Table 5: Economic sizes of small ruminant farms

	Farm size groups			Average of farms
	Small	Medium	Large	
Gross margin (ECU)[1]	3.419	3.630	8.524	3.946
ESU (Gross margin/1200)	2.850	3.020	7.100	3.290

[1]1 ECU = 576,000 TL

small and 27% of them are below average in terms of farm size. The rate of farms above the average is only 7%.

The highest share of the livestock production in the total gross margin in the Sanliurfa province is in the 4-8 ESU class. In the 8-16 ESU class, however, the share of the livestock production is the lowest. The average land size of this group is approximately 10.7 ha. The land assets of the farms smaller than 4 ESU is 9.2 ha and this group has the lowest population with 8.6 people (Table 4).

In terms of economic size, Turkish farms are below average of EU and small family farms are common. Similar results have been obtained by other studies carried out by Rehber *et al.* (2002) in the Bursa province farms and by Gundogmus (2000) in the specialized farms in the Konya province. These studies reveal that 29% of the Bursa province farms are very small, 54% of them are small and 17% are below the average, whereas 43% of the Konya province farms are very small, 34% of them are small, 16% are below the average and only 7% are below the average in terms of economic size.

In the studied, farms calculated gross margins are given in Table 5. The average farm size is calculated as 3.29 ESU. In the small farms the economic size is 2.85 ESU in the medium farms, it is 3.02 ESU and in the large farms, which has >200 small ruminants it is 7.10 ESU (Table 5).

That the above given economic sizes are smaller than the value of 7.6 ESU, which is calculated in this study results from regional differences and the fact that population starts from 10 small ruminants and that standard values have not been used when calculating gross margins.

DISCUSSION

In 2000 in the EU, the FADN data are acquired from sample farms that comprise 1.5-2% (>3000-4000) of the 197,500 farms representing the farms specialized in raising sheep and goats. Twenty eight percent of these farms are >8 ESU, 55% are smaller than 16 ESU and only 13% of them are larger than 40 ESU. According to the distribution, of the small ruminant population among countries, Spain is the leading country with a share of 18%. Spain is followed by Greece (17%), Italy (15%), England (15%), France (11%) and Portugal (9%) (Eurostat 2006 a).

Ninty seven percent of the livestock assets of the pasture-based livestock raising farms (TF14) are comprised of small ruminants in Greece. This ratio is 83% in Sanliurfa farms specialized in small ruminant raising. Total 72.5% of the livestock assets in Portugal, on the other hand, are comprised of small ruminants (Eurostat, 2006a).

The economic size of the farms raising small ruminant in Sanliurfa is close to Portugal farms with a value of 7.6 ESU, whereas the livestock assets of these farms are larger than Portugal (11.5) with a value of 15.4, yet smaller than that of Greece (26.5). Since, the 2-ESU threshold value in Greece causes to expand the farms that comprise the main population of the FADN and are taken into the sample from here, the average sizes obtained are greater in value than normal. Therefore, it is important to calculate the threshold value for Turkey according to the status of the farms and the agricultural structure (Eurostat, 2006).

In Poland, 745,025 of 2,139,784 farms exceed 2 ESU, which is established as the threshold value. In Poland, SGM for 35 crop production and 23 livestock production activities are calculated in the year 2000. Accordingly, 33.8% of the pasture-based livestock production farms (TF8) are 2-4 ESU (very small), 28.9% are 4-8 ESU (small), 25.9% are 8-16 ESU (below the average), 10.6% are 16-40 ESU (above the average) and 0.80% are >40 ESU (Osuch *et al.*, 2003).

The economic sizes of the farms are also affected by the subsidies to agriculture by countries and the level of costs. When calculating gross farm incomes in the FADN, supports are also added to income. Therefore, gross farm incomes are compared with and without including subsidies. In EU, starting from 4-8 ESU farm size, the gross farm unsubsidized incomes are smaller than

Table 6: Gross Farm Incomes (ECU)

	SE131		SE(230+245)				SE410			
	EU (a)	Sanli urfa (b)	EU (c)	% (c/a)	Sanli urfa (d)	% (d/b)	EU*	EU**	Sanli urfa (e)	(e)/EU** (%)
0≤4 ESU	6.856	5.626	3.512	0.51	3.869	0.69	5.079	3.464	3.122	90.12
4≤8 ESU	13.084	10.704	9.156	0.70	8.875	0.83	9.564	6.153	6.776	110.13
8≤16 ESU	23.003	21.350	16.291	0.71	14.912	0.70	16.502	8.948	13.301	148.65
16≤40 ESU	41.395	44.408	27.325	0.66	31.545	0.71	29.640	14.531	27.571	189.74
40≤100 ESU	86.384	-	49.643	0.57	-	-	60.573	24.990	-	-
≥100 ESU	211.422	-	74.409	0.35	-	-	132.193	54.983	-	-

*Subsidized, **Nonsubsidized

Sanliurfa farms and the differences among them increase as the farm size increases. However, their gross farm incomes become higher than those of the Sanliurfa farms when incentives are included (Table 6).

CONCLUSION

Some of the important outcomes of the study are outlined:

- Eighty three percent of the livestock assets in terms of total LAU in the studied farms are small ruminants.
- The share of livestock production in the total gross margin is 83%.
- The land sizes of the 50% of the farms are below 5 ha, 95% of the total land is crop area and wheat and barley are the most commonly cultivated products.
- The average farm size is 7.61 ESU.
- The Annual Work Units (AWU), which is accepted as 2200 h per annum, varies between 1 and 1.9 AWU in the various EU member states. Sanliurfa has the highest AWU with a value of 4.45.
- The small ruminant assets of the farms are 15.43 LAU and this value is higher than only Portugal farms among the EU member states.
- When the gross values of the farms compared with each other without including subsidies, the gross income of the small ruminant farms in Sanliurfa is 10-90% higher than those of EU farms except 0 = 4 ESU class.
- The farm land sizes in EU vary between 11 and 538 ha approximately, whereas this value is between 9-16 ha in the studied farms.
- The fact that most of the farms are small family farms in Turkey and they do not kept account record. Those are the most significant limiting factors concerning the application of the system.

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