

The socio-economics of sheep and goat farming in Greece, and the implications for future rural development.

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Summary

The farming of sheep and goats is the most important activity in the animal production sector of Greece, both in terms of employment (about 300,000 families) and overall income (45% of the gross value of animal production). There are 9,200,000 sheep and 5,600,000 goats, of which 95% of the adult females are milked, primarily for cheese production. This paper gives a current overview of the characteristics of the sector in terms of production system, livestock utilised, livestock performance, farm economics, farmers' sociological profile, as well as the processing and marketing sector. The future implications from continuing the activity of sheep and goat farming in Greece are explored through the study of different scenarios, after examination of the frameworks (E.U., national, regional) within which the sector is operating. It is concluded that this sector will continue to be the engine of the rural economy, continuing to support the existence of the human presence in the LFAs of Greece.

Introduction

Sheep and goat farming in Greece, according to the latest survey is practised on about 300,000 farm units. Even counting units with more than 10 adult female animals, this number is about 155,000 farms. The average size of the units with more than 10 animals is 84 sheep and 99 goats. According to the latest census, there are in Greece 9,200,000 sheep and 5,600,000 goats. It is estimated that sheep and goats utilise 10.5 million tones of herbage dry matter produced each year on the rough grazing lands of the country (Hadjigeorgiou & Papavasiliou, 1998) and contribute 45% of the gross value of animal production, or 15% of the gross value of Greek agricultural production.

These animals belong to dual-purpose breeds (milk and meat). It is characteristic that among European countries, Greece has the highest proportion of milked adult female sheep and goats, approaching 95% of the total. Most of the milk produced by these animals is transformed to cheese in industrial and artisan enterprises. The rest is made into a variety of traditional products (including yoghurt). Meat production is mainly orientated around lambs and goat-kids, which are sold young, at low weights and relatively high prices (Zervas *et al.*, 1999).

The major production system in the sector can be characterised as shepherded-extensive and represents 85% of the total number of animals. Sheep and goats are farmed in all regions of the country and spread more or less evenly. Moreover, since the country is characterised by a mountainous relief and large numbers of islands, the majority (80% of the sheep and 90% of the goats) of the animals are farmed within the Less Favoured Areas (LFAs), as defined in Dir. 75/268/EEC.

Brief technical description of the sector

The systems of farming sheep and goats which are practised in the country can be grouped in the following three classes (Kazakopoulos *et al.*, 1998):

a) *Home fed*: A small number of sheep and/or goats of high producing breeds are kept indoors and bred intensively. The animals are fed large quantities of grains and by-products and limited amounts of forages, and they usually perform above average.

b) *Intensive*: This is mainly a system applied in lowlands, where sheep/goat units are of small to medium size (30-80 head). The animals belong to high performance breeds or local breeds upgraded by cross-breeding and their performance is good. The animals are housed and they usually graze for some hours daily on pastures adjoining the unit. They are fed supplements of concentrates and hay. Sheep energy requirements in this system were estimated to be supplied 53% from grazing and 47% from supplementary feeding (of which 41% concentrates and 6% roughage). The respective values for goats were 73% from grazing and 27% from concentrates.

c) *Extensive with or without transhumance*: This system is applied in the LFAs, and the animal flocks vary in size (100-600 heads) consisting of local breeds, whose performance is not always satisfactory. Sheep and goats graze throughout the year, but herbage intake is sufficient to meet the nutritional requirements of these animals only for 3-5 months (March - April to June - July). On an annual basis, it was estimated that concentrates, roughage and grazing contributed 36 %, 26 % and 38 % of total energy requirements respectively for sheep and for goats, 15 %, 2 % and 83 % respectively.

At the accession of Greece to the E.U. in 1981 there were 8,316,000 sheep and 4,623,000 goats while at the same time the numbers of the respective farms were 217,810 and 323,630. The numbers of sheep and goats have increased slightly since then (11% for sheep and 22% for goats) (Table 1), but the numbers of the farm units have fallen dramatically (to 43% of the number in 1981 in the case of sheep and to 51% for goats, see Table 2), due to specialisation and reorganisation of the sector.

TABLE 1. Population trends of sheep and goats in Greece through the period 1981-1995 (proportional changes since 1981, %).

	1981	1991	1993	1995
Sheep	100	111.9	109.8	110.7
Goats	100	121.3	116.9	122.1

Source: Ministry of Agriculture, Greece.

TABLE 2. Changes in the numbers of sheep and goats farms in Greece in the period 1981-1995 (proportional changes since 1981, %).

	1981	1991	1993	1995
Sheep	100	73.7	65.7	57.2
Goats	100	62.6	64.6	49.2

Source: Ministry of Agriculture, Greece.

The development of the quantities of milk and meat produced in the period 1981-1995 followed a slight increasing trend, after the increase of the numbers of animals. However, these changes were not strictly proportional. Sheep production increased by 3.8% while goat meat production increased by 17.8 %, due to low meat prices when the competition for sheep meat was strong. On the other hand, sheep and goat milk increased by 13.6 and 7.0 percent respectively, due to the relatively good prices that the sheep milk had and the low prices for goats milk.

TABLE 3. Changing production of sheep and goat meat and milk (in tons) produced in Greece in the period 1981-1995 (proportional changes since 1981, %).

	1981	1991	1993	1995
Sheep meat	100	103.7	103.3	103.8
Goats meat	100	114.0	117.4	117.7
Sheep milk	100	112.2	112.8	113.6
Goats milk	100	109.5	110.7	107.0

Source: Ministry of Agriculture, Greece.

The populations of sheep and goats are evenly distributed throughout the country, and their distribution is associated with the distribution of the rangeland areas (Table 4). Although a substantial reduction in the number of the nomadic and home-fed animals is observed in the recent years and the flocks tend to be kept sedentary, the nutrition of the animals is largely based on the use of the available rough grazing lands which represent a large proportion (39.6%) of the total country land area. Most of this rough grazing area, around 83%, is located in mountainous and semi-mountainous regions and more than half of this (57.5%) belongs to the so-called communal pastures (Polyzos, 1991). However, since the management of the communal pastures is insufficient and their grazing potential unevenly utilised (overgrazing in the lowlands and abandonment of lands on the inaccessible mountainous and semi-mountainous regions), their spontaneous productivity is declining, at least in the long term.

TABLE 4. Distribution of sheep and goats by region of Greece as compared with that of the available rangeland areas.

REGION	Rangeland area (%)	Sheep (%)	Goats (%)
Stereia Ellas and Evia	19.01	17.64	18.37
Peloponissos	15.68	15.28	17.94
Ionian islands	2.08	1.41	2.73
Epirus	9.25	9.31	5.98
Thessalia	10.25	16.51	12.02
Makedonia	22.71	15.63	20.39
Thrace	4.75	4.11	5.44
Aegean islands	8.36	5.76	6.64
Crete	7.91	14.35	10.49
Total	100	100	100

Source: Ministry of Agriculture, Greece.

Sheep and goats in Greece are mainly dairy type, but animals are highly variable in their morphology, body size, milking capacity, prolificacy, carcass composition and growth rate. However, these animals have a strong constitution and perfect adaptability to the harsh environmental conditions. The amount of milk produced per animal and year differs between breeds. Variation (Hadjigeorgiou and Papavasiliou, 1998) ranges from 90 to 240 kg for sheep and 100 to 370 kg for goats. The amount of milk produced is actually a function of the daily produced milk and the lactation length, both of which vary between breeds. The more productive dairy breeds have a longer lactation period, which ranges between 200- 230 days, while the average lactation length is between 160 and 180 days.

Socio-economic description of the sector

Economic data of the sheep and goat farms presented in this study are derived from F.A.D.N. (Farm Accounting Data Network) for the years 1989-1995. The present data are averages of 263 farms with a technical-economic specialisation in sheep and 133 farms of a respective specialisation in goats, which for short will be called “sheep farms” and “goat farms” respectively. These farms are all of a size greater than two European Standard Units (E.S.U.), where 2 E.S.U.’s give a Gross Typical Profit of 2,400 Euro. The average size of the sample farms is 21.1 Livestock Units (L.U.) for sheep and 31.9 L.U. for goat farms, where each L.U. is 6.5 sheep or goats. The farms studied represent at the national level 20,133 and 13,343 sheep and goat farms respectively, of a similar specialisation.

TABLE 5. Evolution of the “gross farm income” of “sheep” and “goat” farms and the “average country farm” during the period 1989-1995 (values are in constant 1990 prices and figures are in 1.000 GRDs)

	1989	1991	1993	1995
Sheep farms	4,017	3,884	4,103	3,715
Goat farms	4,097	3,678	4,172	3,898
Average farm	3,361	3,450	3,251	3,294

Source : Tsimpoukas et al., 1996 and Tsimpoukas et al., 1998.

The “gross farm income” of the farms specialising in sheep and goats was first compared with that of the “average country farm”. It was clear that the income of “sheep” and “goat” farms was higher than that of the “average country farm”. Moreover, the overall trend during the years 1989-1995 was that of stability, when the values were transformed to constant 1990 prices (Table 5). Although figures are given in GRDs they can be transformed to ECU’s at a ratio of 0.00496 ECU’s per GRD.

The “net farmer and family income” was a second variable to be compared. This figure is the product of subtraction of the “real expenses” (i.e. purchase of production materials and external labour) from the “gross farm income” and associates with the viability of the unit. The “net farmer and family income” of the sheep and goat farms and that of the average country farm is presented in Table 6. The overall trend is a declining one for all farm types, though “goat” farms have a higher income than “sheep” farms and this in turn is higher than that of the “average country farm”. “Goat” farms have a higher net income due to lower dependence on purchased feedstuffs, since goats are better adapted to utilise the available rangeland areas (Hatziminaoglou et al., 1995).

TABLE 6. Evolution of the “net farmer and family income” of “sheep” and “goat” farms and the “average country farm” during the period 1989-1995 (values are in constant 1990 prices and figures are in 1,000 GRDs).

	1989	1991	1993	1995
Sheep farms	2,338	2,171	2,360	2,034
Goat farms	2,747	2,322	2,773	2,472
Average farm	1,998	2,003	1,789	1,840

Source : Tsimpoukas et al., 1996 and Tsimpoukas et al., 1998.

The evolution of the indicator “gross farm income” over “real expenses and depreciation” during the period 1989-1995 was also explored (Table 7). It was clear that “goat” farms had a higher ratio (this showing higher returns on given expenses), while “sheep” farms and the “average farm” had similar indicators.

TABLE 7. Evolution of the indicator “gross farm income over external expenses” of “sheep” and “goat” farms and the “average farm” during the period 1989-1995.

	1989	1991	1993	1995
Sheep farms	2.4	2.3	2.4	2.2
Goat farms	3.0	2.7	3.0	2.8
Average farm	2.4	2.4	2.2	2.3

Source : Tsimpoukas et al., 1996 and Tsimpoukas et al., 1998.

A second indicator, the “proportion of subsidies in gross farm income” shows the dependence of farm income on subsidies, and the evolution of this in the period 1989-1995 (Table 8) followed an increasing trend for all types of farms mainly due to decline in “sales income”. This also demonstrates the increasing importance of the agricultural policies applied (mainly E.U. policies) in supporting the family income in LFAs, and therefore maintaining the existence of human populations in LFAs. However, “sheep” farms appeared to be less dependent on subsidies than the other two farm types - this difference attributable to the relatively good prices of the sheep-milk. The proportion of subsidies

in “gross farm income” of sheep and goat farms in Greece is low when compared with other cash crops (e.g. tobacco, cotton) and also is among the lowest of all sectors in the E.U.

TABLE 8. Evolution of the indicator “proportion of subsidies on gross farm income” of “sheep” and “goat” farms and the “average country farm” during the period 1989-1995.

	1989	1991	1993	1995
Sheep farms	14.7	17.3	19.5	20.5
Goat farms	16.8	15.8	23.9	25.7
Average farm	16.7	19.6	25.9	26.3

Source : Tsimpoukas et al., 1996 and Tsimpoukas et al., 1998.

The “gross farm income” per L.U. had a similar evolution over the examined period for both types of farms (Table 9). However, “sheep” farms had a higher income per L.U. than “goat” farms, though the former depended more on subsidies and compensations. Moreover, the ratio of the “sheep farm income” over “goat farm income” was 3:2, which was identical to that of the ratio of sheep-milk price to goat-milk price. Both farm types had income which was derived from crop production sales, whereas the self-consumption portion was found to be relatively small.

TABLE 9. Evolution of the “gross farm income” components per L.U., of “sheep” and “goat” farms, during the period 1989-1995 (values are in constant 1990 prices, and figures are in 1,000 GRDs)

Sheep farms	1989	1991	1993	1995
Crop production sales	11.9	9.4	7.1	9.0
Animal production sales	150.8	147.2	153.8	129.4
Subsidies and compensations	32.3	35.6	41.6	36.8
Self-consumption	9.2	10.1	10.0	7.6
Accountant differences	-2.3	-7.0	-6.3	-6.7
Gross Farm Income	201.9	195.2	206.2	176.1

Goat farms	1989	1991	1993	1995
Crop production sales	6.2	5.3	5.2	4.1
Animal production sales	102.3	95.9	106.2	88.7
Subsidies and compensations	25.7	20.9	34.8	31.6
Self-consumption	7.2	6.6	7.0	5.2
Accountant differences	-0.6	-2.3	-9.9	-7.3
Gross Farm Income	140.8	126.4	143.4	122.2

Source : Tsimpoukas et al., 1996 and Tsimpoukas et al., 1998.

Another important element of the farm economics is the work invested. Table 10 shows the distribution of the available workforce (total, family and hired) on three classes of farms, according to their economic size (expressed in E.S.U.’s). It is clear that farms are using almost exclusively family labour, allowing a higher “net farmer and family income”. Moreover, there is no large difference between “sheep”, “goat” and the “average farm” in the proportion of the total contributed by the family workforce. In fact, as enterprises increase in size, so the workforce proportionally increases at a faster rate. This is explained by the fact that sheep and goat farming is practised extensively, and therefore extra workforce is required the larger the units are. There is little interest among sheep and goat farmers in introducing labour-saving machinery or other facilities. The productivity of labour is also affecting the “net farmer and family income”, this usually done by increasing the flock size. Furthermore, sheep farms utilise family labour while for goat farms, as size increases, the more hired labour is used.

TABLE 10. Total available workforce (family and hired) (in H.L.U./farm) used in “sheep” and “goat” farming sectors and the average Greek farm classified in three E.S.U. classes (figures are averages of years 1993-1995).

	Total available workforce			Family workforce			Hired workforce					
	2-16	16-40	>40	2-16	16-40	>40	2-16	16-40	>40			
	Mean			Mean			Mean					
Sheep farms	1.80	2.30	2.80	1.87	1.80	2.10	2.80	1.80	0.00	0.20	0.00	0.07
Goat farms	1.73	2.07	3.55	1.87	1.63	1.97	2.10	1.80	0.03	0.13	1.45	0.10
Average farm	1.70	2.10	2.50	1.80	1.60	1.80	1.80	1.60	0.10	0.30	0.70	0.13

Source : Tsimpoukas *et al.*, 1998.

Table 11 shows the distribution of work undertaken on farms by family members, in three classes according to the farm economic size (expressed in E.S.U.). It is evident that the farmer contributes more than 55% of the necessary labour, while the spouse contributes about 30%, and the rest (about 15%) is supplied by other family members. Family member workforce is particularly important for sheep farms and clearly larger than the average, whereas this is more prominent the bigger the units are. The contribution of the farmer is higher on the “average country farm” than the other two comparatives. However, it becomes evident from Table 12 that “sheep” and “goat” farms require longer hours of work than the “average farm”, since the former are requiring 101.8 and 105.5% of Human Labour Unit (H.L.U.) each, while the latter is utilising H.L.U. by 75%.

TABLE 11. Contribution of the family members to the total available, non paid, family workforce used in “sheep” and “goat” farming sectors and the average Greek farm classified in three E.S.U. classes (figures are averages of years 1993-1995).

	Farmers work/ Total work			Spouse work/ Total work			Member work/Total work		
	2-16	16-40	>40	2-16	16-40	>40	2-16	16-40	>40
	Mean			Mean			Mean		
Sheep farms	0.556	0.477	0.357	0.296	0.222	0.286	0.111	0.238	0.357
	0.556			0.296			0.129		
Goat farms	0.613	0.509	0.583	0.265	0.253	0.142	0.102	0.169	0.200
	0.557			0.260			0.129		
Average farm	0.625	0.556	0.556	0.250	0.259	0.203	0.062	0.167	0.203
	0.625			0.271			0.083		

Source : Tsimpoukas *et al.*, 1998.

TABLE 12. Proportion of the work offered by family members (in relation to the M.W.U.) used in sheep and goat farming sectors and the average Greek farm classified in three E.S.U. classes (figures are averages of years 1993-1995).

	2-16 E.S.U.	16-40 E.S.U.	> 40 E.S.U.	Mean
Sheep farms	101.3	103.3	105.2	101.8
Goat farms	106.4	104.4	124.0	105.5
Average farm	72.4	82.8	86.3	74.9

Source : Tsimpoukas *et al.*, 1998.

The average age of the farm leader is appearing in Table 13 through the period of years 1989-1993 and for the three farming directions. It appears that the average age of the farmer and that of the sheep farmer is 50 years, while the goat farmers are 2 years younger than the average farmer.

TABLE 13. Average age of the farm leader in “sheep” and “goat” farming sectors and the average country farm in the period 1989-1993.

	1989	1990	1991	1992	1993
Sheep farms	50.7	48.8	50.8	50.6	50.7
Goat farms	47.6	47.9	47.8	48.4	48.3
Average farm	50.8	49.8	50.4	51.6	50.8

Source : Tsimpoukas et al., 1996.

In a different study (Theodoropoulos, personal communication), where the structure of the sheep and goat farms in the Prefecture of Trikala (an LFA in Central Greece) was explored, the age of the respective farmers, on a sample of 57, was found to be distributed as follows.

25-29 years of age	5.25 %
30-44 ‘	12.30 %
45-64 ‘	68.45 %
65 and over	14.00 %

On the same sample the education level was found to be distributed as follows:

No school at all	31.58 %
Some years of elementary school	15.79 %
Elementary school	26.32 %
High school (9 years)	12.28 %
High school (12 years)	5.26 %
Technical school (12 years)	7.02 %
Over 12 years of school	1.75 %

The hard working conditions required by the production systems for sheep and goat farming have negative implications for this profession and result in it being considered as “not socially acceptable”. Consequently, the young farmers are reluctant to follow that profession and this is causing a significant problem of succession. In addition, the heads of these farms tend to be ageing, which explains the unwillingness of the sheep and goat farmers to improve their system, especially if no succession prospects exist. According to a survey (Goussios et al, 1989), only 20.7 per cent out of a total of 630 livestock holdings had succession potential, while 36.5 per cent of them did not have any such potential. The rest were uncertain about their succession prospects.

Processing of milk and marketing of cheese.

The processing sector of sheep and goats milk in Greece is characterised by a large number of cheese making factories, of small size, and widely distributed. Although the numbers of factories are declining (Table 14), there still are a significant number of them operating in the country. However, these units do not appear competitive on a European level, since the average annual production per unit approaches just 175 tons (Table 14). The distribution of cheese making factories is associated with the structure and the prevailing production system in the sheep and goat sector. The most important reasons for the development of a large number of small capacity cheese making factories are the small size of flocks of sheep and goats and their wide dispersal, often in isolated and remote areas, where the pasture lands are located,. Moreover, it is estimated that about 1/3 of the cheese produced is made on the farm for self consumption and sale through informal networks.

TABLE 14. Number of cheese making factories and their average annual production by type of cheese (1988-1994)

	Number of units			Average annual production (tons)		
	1988	1991	1994	1988	1991	1994
Soft cheese	794	567	623	85.5	115.1	142.4
Hard cheese	390	275	278	40.5	46.7	45.6
Semi-hard cheese	164	55	56	82.3	138.2	266.1
Whey cheese	412	461	582	14.2	15.7	18.2
Total cheese	939	674	727	110.0	137.9	174.6

Source: Ministry of Agriculture, Greece.

The fact that these factory units operate periodically (about 6 months per year), since the milking period of sheep and goats lasts 5-6 months, restricts the economic returns of the operation of these enterprises. However, there is a trend towards the reduction of the number of cheese making factories and the number of the people they employ, and an increase in the average number of employees per unit as demonstrated in Table 15.

TABLE 15. Development of the number of milk processing units (including cheese making factories) and their employees in the period of years 1971-1991

	1971	1981	1991
No of milk industry units	1,423	1,160	848
Number of employees	3,228	3,141	2,673
Employed persons per unit	2.3	2.7	3.2

Source: NSSG, Industrial Research

The improvement in transportation conditions during the last decade on the one hand (roads, transportation means) and the creation of large supermarket (S.M.) chains on the other hand, played an important role to the decrease in cheese units. According to a survey produced by “Nielsen” and published in the Greek Journal of “Food and Beverages” under the title “Survey of family consumption in the regions of Athens and Thessaloniki”, S.M. accounted for more than 50% of the cheese sales of all types of cheese (see Table 16) with second more important being the special shops (delicatessen). Moreover, these large S.M. created the need to establish the flow of cheese products at constant quality and volume, demanded large quantities of these products at competitive prices and asked for novel products. These and other demands, at both technical and financial levels, made that small cheese making units could not sustain for long.

TABLE 16. The distribution of cheese sales in various shops in the regions of Athens and Thessaloniki.

	Supermarkets	Small S.M.	Groceries	Special shop	Producers	Other
Feta	47	2	15	22	12	2
Kasseri	56	3	15	23	1	2
Kefalotyri	54	2	13	25	3	3
Graviera	52	4	10	26	4	4
Edam/Gouda	67	1	7	20	0	5
Special cheeses	68	15	8	8	0	1

Discussion

The sheep and goat sector in Greece has always had a strong connection with rural areas. This sector was always effectively utilising the natural resources of the rural areas, this primarily including the indigenous vegetation, for the production of valuable goods. However, the level of income from farming of livestock mainly depends on the size of the flock, irrespective of the animal’s productivity

(Apostolopoulos and Rogdakis, 1996). Farmers rely more on the increase of the flock size which results in increasing family income from subsidies and other compensations, rather than increasing production efficiency. On the other hand farmers are more interested in improving labour efficiency rather than making capital investments (Spathis et al., 1998).

In recent years some of the basic geo-political elements of the past have changed. Moreover, sheep and goat farming is in the process of transformation under the pressure of the internal social factors and the global environment. The role of subsidies is shifting under "Agenda 2000", prices of raw materials and final products are changing due to opening of the global markets. Consumption habits are also changing due to the introduction of new marketing policies and conditions. In our opinion, the options are still open. Choicis and Vallerand (1996) recognised three possible scenarios for the sector which are schematically presented in Figure 1.

The extensification scenario is the most possible for the mountainous and the marginal areas of the country. In those areas, there is a low population density, low productivity, and a very low level of investment. It is difficult to stimulate the rural economy. The few jobs that can be created will be in the primary sector. Some of the marginal areas, because of their specific characteristics, may have an advantage over others. These areas may, for example, be near cities, have scenic value or have some infrastructure and because of these the areas have the chance to divert to pluriactivity. In this scenario the income of the rural areas derives from a variety of activities (such as the various forms of tourism, the creation of small industries etc.). A variety of jobs in all three sectors of the economy can be supported, and this will sustain an acceptable number of people in an area. The intensification scenario is likely to happen when medium to large industries are established in an area and cultivate the sector mainly towards the production of low-cost products. This model can create infrastructure in an area and a variety of jobs in all sectors of the economy. However, pollution and social degradation problems often are connected with this option. Between the intensification and pluriactivity routes there is a difference in the mass of small cheese making units, which can create development "nuclei" by offering to collect milk for the production of special products.

The issue of rural development is a multidimensional problem. However, it is clear that the primary sector (i.e. agriculture) is a key lever to this direction. Sheep and goat farming is very likely to continue the role of engine, continuing to support the existence and progress of humans on the LFA's.

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Diagram 1. Organization directions of the sheep and goat farming systems.

