

Determinants of extensive sheep production systems in Central Greece

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Abstract

Sheep breeding is regarded as an important activity for a large part of rural population in Greece. For this reason, the determinants of sheep production systems were investigated based on standardized questionnaires and in-depth interviews with all sheep breeders at the six districts of the Municipality of Kilada, Larisa, in Central Greece during 2010. The data were processed using Pearson's test ($p \leq 0.05$). Farmer's age, holding structure (family, individual) and flock size were considered as independent variables (determinants). Such results are expected to be useful for rangeland managers and policy makers. It was found that the older farmers avoid using temporary pastures and use more stubble fields during autumn. They also prefer to practice hand milking. On the other hand the younger farmers establish temporary pastures utilizing agricultural land of small size and tend to make higher investments in establishing and fertilizing them. They also use these pastures as long as possible during spring and appear to be willing to insert more milk-productive races such as "Chiotiko", to keep bigger flocks and to apply mechanized milking. Age-independent variables appear to be the use of rangelands, the practicing of transhumance and the grazing in snowing days. Cultivation cost/ha also seems to be an age-independent variable, either as self-made or as employed service, as well as watering of temporary pastures. Owners of family holdings are willing to lead their flocks in a long distance in order to secure natural forage but mainly during summer and autumn. The holdings which employ only family members invest more financial means for purchased feedstuffs such as hay of legume as they are not so willing to pasture on the rangelands during the winter days in contrast to the non-family shepherds. Farmers practicing transhumance seem to employ non family members for this purpose and return in October, later than farmers which employ only family members. The owners of big flocks have a tendency to keep longer transhumance period during autumn and they are also more willing to spend longer time on rangelands during winter. As a result, they use less condensed feedstuffs in autumn. Also, they do not have sheds in residential areas.

Key words: Rangelands, sheep farming system characteristics

Introduction

Sheep farming is one of the most financially important production sectors in Greece. About 9 million animals belonging to 127937 holdings (NSSG 2009) are raised for milk and meat (lambs) production. The majority of these animals (85%) are extensively managed in marginal areas. Sheep

production is based traditionally on grazing of communal natural grasslands, which can provide herbage to animals only for 6-7 months annually (Yiakoulaki et al. 2003). In order to fill the feed gap, the Greek farmers utilize alternative resources, including temporary pastures of annual winter cereals during early spring and cereal stubble fields after crop harvesting during summer-early autumn. In addition, they make extensive use of purchased feedstuffs throughout the year, resulting in high product cost. The latter is one of the main weaknesses of sheep farming in Greece and affects its competitive profile (Aggelopoulos et al. 2009).

Due to the great importance of sheep farming, several researches have been carried out regarding the socio-economic aspect and viability of this sector as well as the potential for further improving its competitiveness (Hatzigeorgiou et al. 1999, Aggelopoulos et al. 2009). However, information concerning the determinants of sheep production system is relatively limited. Such data are necessary for improving knowledge about livestock farming systems. This is expected to be useful for policy makers and rangeland managers in order to achieve a more effective and acceptable policy planning.

The aim of this study was to investigate the determinants of extensive sheep production system in the Municipality of Kilada, Larisa, Central Greece.

Materials and methods

This study was conducted in the municipality of Kilada, Larissa in central Greece, during the summer of 2010. This particular research area has been selected as sheep breeding is of great socio-economic importance for the rural community. Additionally, the ecological conditions of this area are typical for sheep breeding. Topography varies with the flat areas occupied by arable lands and the hills and mountains covered by natural vegetation. The latter is dominated by evergreen shrublands, mainly composed of kermes oak (*Quercus coccifera* L.) interspersed by openings with herbaceous species. This study was based on the collection of primary data through standardized questionnaires and in-depth interviews with all sheep farmers (n=60) of the six districts of the municipality of Kilada. The questions concerned the animal capital, the characteristics of the holdings, the farm and farmers' profile, the utilization conditions of natural resources (communal natural grasslands, temporary pastures, fields of cereal stubble, season of grazing, transhumance, etc.) and the supplemented feedstuffs (type, quantity, cost, feeding time). The data were processed by Pearson's

test ($p \leq 0.05$). Age of holding owner, holding structure (family, individual) and flock size were considered as independent variables (determinants).

Results and Discussion

The mean age of the farmers is 56.4 years, ranging is from 27 to 80 years. Thus, farmers under 56 can be regarded as “younger”, while over 56 as “older”. In Table 1, the farmer’s age appears to be relevant for a great variety of technical and bio-economic characteristics. Specifically, the older farmers avoid using temporary pastures (-0.314). This is an option for younger farmers as the temporary pastures necessitate investment of time, work and financial means. Those who use temporary pastures normally utilize small areas of agricultural land (-0.343). This is in accordance with the socio-historical conditions of rural area in Greece where the agricultural land is divided in small holdings. Additionally, the younger farmers tend to use temporary pastures for as many months as possible during winter – early spring (-0.383) trying to cover the feed shortage of rangelands during this period. On the contrary, the older ones use more stubble fields in terms of months and hours/day (0.287 and 0.294, respectively) in autumn. This can be attributed to the easy accessibility of stubble fields by older farmers as well as to the appropriateness of climatic conditions. The younger farmers also seem to invest more financial resources in establishing temporary pastures (-0.284) and to use more fertilizers (-0.290), as they are more willing to take the risk of dynamic enterprising. They also appear to be willing to insert more milk productive races such as “Chiotiko” (-0.393), to keep big flocks -over 220 animals- (-0.372) and to apply mechanized milking (-0.350). On the contrary, the older farmers, keeping small flocks, prefer to practice hand-milking (0.412) as they are not –and don’t want to be- familiar with new technologies. There are also age-independent variables, which appear to be grazing in rangelands as this is the main -if not the only possible- option, the practicing of transhumance as this depends on a great range of possible determinants beyond the age (e.g. pluriactivity, family tradition, etc), the grazing in snowing days as this depends on factors other than age, such as the sensitivity of animals to extreme weather conditions. Age-independent variables also seem to be cultivation cost/ha, either as self-made or as employed service, and watering of temporary pastures.

Table 1. The effect of farmers' age on sheep production system in Central Greece

	Age of farmer				
	Co-efficient	Sign.		Co-efficient	Sign.
Using temporary pastures	-0.314(*)	0.015	Cultivation cost/ha (self-made service)	-0.195	0.136
Area of temporary pastures used	-0.343(**)	0.007	Cultivation cost/ha (employed service)	-0.068	0.606
Hand-milking	0.412(**)	0.001	Watering of temporary pastures	-0.057	0.664
Mechanized milking	-0.350(**)	0.006	Keeping indoor when snowing	0.144	0.272
Duration of temporary pastures use in spring (months)	-0.383(**)	0.003	Grazing in rangelands	0.144	0.272
Cost/ha of establishing (seeding) temporary pastures	-0.284(*)	0.028	Transhumance	-0.087	0.507
Using fertilizers (kg/ha)	-0.290(*)	0.035			
Duration of stubble use in autumn (months)	0.287(*)	0.026			
Duration of stubble use in autumn (hours/day)	0.294(*)	0.023			
Breeding race of "Chiotiko"	-0.393(**)	0.002			
Flock size	-0.372(**)	0.003			

** Correlation is significant at the 0.01 level, * Correlation is significant at the 0.05 level

Owners of family holdings (Table 2) are willing to lead their flocks in a long distance in order to secure forage for their animals, but mainly during summer (0.264) and autumn (0.274). The holdings which employ only family members invest more financial means for purchased feedstuffs, such as hay of legume (0.378) as they are not so willing to lead their animals on rangelands during the winter days in contrast to the non-family shepherds (0.393).

Holdings practicing transhumance seem to employ non-family members (0.397) for this purpose and return later in October (0.408) than holdings which employ only family members. Obviously, the holdings which employ only family members try to avoid any hard working condition. This seems to be an assignment for non-family employees. Thus, the family holdings which employ non-family members do it in order to avoid difficult working condition apart from coping with high work load in case of big flock size (Table 3).

Table 2. The effect of holding's personal structure in extensive sheep production system in Central Greece

	Family holding		Family employees		Non family employees	
	Co-efficient	Sign.	Co-efficient	Sign.	Co-efficient	Sign.
Distance travel during summer	0.264(*)	0.041	0.111	0.397	-0.008	0.949
Distance travel during autumn	0.274(*)	0.034	0.124	0.345	0.095	0.469
Roughages (total cost annually)	0.218	0.095	0.378(**)	0.003	0.195	0.135
Straw (total cost annually)	0.036	0.787	0.173	0.187	0.393(**)	0.002
Transhumance	0.056	0.672	0.222	0.089	0.397(**)	0.002
Return from transhumance	0.000	1.000	0.159	0.225	0.408(**)	0.001

** Correlation is significant at the 0.01 level, * Correlation is significant at the 0.05 level

The owners of big flocks (Table 3) have a tendency to keep longer transhumance period (0.597), as they return late in October and not in September, and also to spend a longer time on rangelands during winter (0.309). This is understandable, provided that the farmers with higher capital are motivated to exploit the available natural resources at the highest degree. As a result they use less quantity of condensed feedstuffs (-0.329), especially in autumn. They also do not maintain sheds in residential areas (-0.389) probably due to the limited agricultural land allocated in these areas for the big-sized flocks and to the EU legislation. Finally, as expected, the number of family (0.431) and non family employees (0.557) increase with the flock size.

Table 3. The effect of flock size in extensive sheep production system in Central Greece

	Flock size	
	Co-efficient	Sign.
Return in late October from transhumance	0.597(**)	0.000
Grazing on rangeland in winter (months)	0.309(*)	0.016
Condensed feedstuff in autumn (kg/day)	-0.329(*)	0.010
Sheds in residential areas	-0.389(**)	0.002
Family employees	0.431 (**)	0.001
Non family employees	0.557 (**)	0.000

** Correlation is significant at the 0.01 level, * Correlation is significant at the 0.05 level

Conclusions

The older farmers avoid using temporary pastures which necessitate additional investment using instead more stubble fields in autumn. The younger ones establish temporary pastures (making higher investments in seeding and fertilizing) and use them as long as possible in spring. Moreover, they appear to be willing to insert more milk productive races, to keep bigger flocks and to apply more mechanized milking.

Owners of family holdings are willing to lead their flocks in a long distance during summer and autumn. The holdings which employ only family members invest more financial means for purchased feedstuffs as they are not so willing to lead their animals for grazing on the rangelands during the winter days in contrast to the non-family shepherds who are employed for coping with more difficult physical conditions and transhumance.

Owners of big flocks tend to be characterized by keeping longer transhumance and grazing period on rangelands, less consumption of condensed feedstuffs in autumn and higher number of employees. Their sheds also tend to be far away from residential areas.

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