

Effects of the economic crisis on sheep farming systems: A case study from the north Evros region, Greece

Manousidis T., Abas Z., Ragkos A., Abraham E.M., Parissi Z.M., Kyriazopoulos A.P.

in

Acar Z. (ed.), López-Francos A. (ed.), Porqueddu C. (ed.).

New approaches for grassland research in a context of climate and socio-economic changes

Zaragoza : CIHEAM

Options Méditerranéennes : Série A. Séminaires Méditerranéens; n. 102

2012

pages 439-442

Article available on line / Article disponible en ligne à l'adresse :

<http://om.ciheam.org/article.php?IDPDF=6992>

To cite this article / Pour citer cet article

Manousidis T., Abas Z., Ragkos A., Abraham E.M., Parissi Z.M., Kyriazopoulos A.P. **Effects of the economic crisis on sheep farming systems: A case study from the north Evros region, Greece.** In : Acar Z. (ed.), López-Francos A. (ed.), Porqueddu C. (ed.). *New approaches for grassland research in a context of climate and socio-economic changes*. Zaragoza : CIHEAM, 2012. p. 439-442 (Options Méditerranéennes : Série A. Séminaires Méditerranéens; n. 102)



<http://www.ciheam.org/>
<http://om.ciheam.org/>

Effects of the economic crisis on sheep farming systems: A case study from the north Evros region, Greece

T. Manousidis^{1*}, Z. Abas¹, A. Ragkos², E.M. Abraham³, Z.M. Parissi³
and A.P. Kyriazopoulos⁴

¹Laboratory of Animal Science, Department of Agricultural Development, Democritus University of Thrace, 193 Pantazidou str., 68200 Orestiada (Greece)

²Department of Rural Development and Agribusiness Management, Alexander Technological Educational Institute of Thessaloniki, Sindos, Thessaloniki (Greece)

³Laboratory of Range Science (236), School of Forestry and Natural Environment, Aristotle University of Thessaloniki, 54124 Thessaloniki (Greece)

⁴Laboratory of Range Science, Department of Forestry and Management of the Environment and Natural Resources, Democritus University of Thrace, 193 Pantazidou str., 68200 Orestiada (Greece)

*E-mail: thmanous@yahoo.gr

Abstract. Extensive and semi-extensive sheep farming constitute the traditional farming systems in the Mediterranean region. These systems are predominantly labor-intensive with relatively low capital requirements, where an essential part of the animal feeding requirements are based on grazing in natural rangelands. The increased market demand for sheep milk and modernization in life-styles has recently resulted in an increase in the intensive sheep farming. The sheep are fed indoors only on purchased or harvested forages produced on-farm and concentrates. Therefore, fixed and variable costs of this system are high. Moreover, the semi-intensive sheep farming system is characterized by grazing in artificial pastures, which reduces the feeding cost. The purpose of this paper is to study the sustainability of the above three sheep farming systems. Technical and economic data from a sample of sheep farms in the north Evros region of Greece were collected in 2011 and analyzed in order to evaluate advantages and disadvantages of each system. The results provide strong evidence that the intensive system has been more adversely affected by the current economic crisis and it is more vulnerable to the potential negative effect of continued volatility of the economy than the semi-extensive ones. This is because the intensive system requires higher variable costs of purchasing harvested forage and concentrates. Although the semi-intensive system exhibits high variable costs, its feeding costs were significantly lower than the intensive.

Keywords. Dairy sheep – Farming system – Variable cost – Grazing – Artificial pasture – Feeding cost.

L'effet de la crise économique sur des systèmes ovins : Le cas de la région d'Evros du nord, Grèce

Résumé. Les systèmes ovins extensifs et semi-extensifs sont typiques dans la région méditerranéenne. Ces systèmes utilisent le travail intensivement bien qu'ils demandent peu d'investissements de capitale, alors qu'une part essentielle de l'alimentation des animaux se base sur le pacage des pâturages naturels. La demande accrue du lait de moutons et la modernisation des sociétés ont eu comme conséquence l'émergence de systèmes ovins intensifs qui sont basés sur la provision des fourrages, provenant du marché ou produits dans la ferme, et des concentrés. Entre ces deux systèmes, le système semi-intensif ovin est caractérisé par l'utilisation des pâturages artificiels, ce qui réduit le coût de alimentation. Cet article examine les perspectives de durabilité des ces trois systèmes ovins. Des données techniques et économiques des fermes ovins situées dans la région d'Evros du nord, en Grèce, ont été rassemblées en 2011 et analysées afin d'évaluer les avantages et les inconvénients de chaque système. Les résultats montrent que les systèmes intensifs ont été affectés par la crise économique courante plus que les systèmes semi-extensifs, car la provision du fourrage et des concentrés du marché élèvent considérablement les coûts variables des fermes en intensif. Bien que le coût variable du système semi-intensif soit élevé, le coût de alimentation est moindre que dans le cas du système intensif.

Mots-clés. Ovin laitier – Système de production – Coût variable – Pacage – Pâturage artificiel – Coûts d'alimentation.

I – Introduction

Evros Prefecture, in north-eastern Greece, covers an area of 424,800 ha of which 42.3% is arable land, 32.3% are forests and rangelands and 10.6% are pastures and grasslands (HSA, 2000). Sheep farming is an important part of the local economy in this region. Particularly, in the northern part of the Prefecture, there are 442 farms rearing 51,357 sheep. Pastures and natural grasslands are limited in this area and crop production includes mainly winter cereals (wheat, barley), maize and lucerne.

Sheep farming systems in the area can be categorized in three types: intensive, semi-intensive and traditional semi-extensive. Within intensive systems, no grazing is applied, automated milking equipment is used and dairy sheep breeds are raised (De Rancourt *et al.*, 2006). Sheep rations are based on lucerne hay and corn silage, mainly produced locally. Recently, the number of intensive dairy sheep farms has increased in the north part of the Prefecture as in many other places in Greece (Tsiboukas, 2006). On the other hand, feeding in the semi-intensive system is based on pasture grazing and harvested forages. Generally, this system is not common in Greece. Finally, in the traditional semi-extensive systems, grazing is applied in communal natural grasslands and on stubble after harvest (Hadjigeorgiou *et al.*, 1999).

The purpose of this paper is to study the sustainability of the above three sheep farming systems in view of the current economic crisis and, in particular, their vulnerability to volatile economic conditions due to their dependence on capital and especially purchased inputs (forage and concentrates, fertilizers, fuel) (FAO, 2008).

II – Materials and methods

Technical and economic data from 57 sheep farms (12 intensive, 4 semi-intensive, 41 semi-extensive) located in the northern Evros area in Greece were collected in early 2011. The intensive and semi-extensive farms were randomly selected using the simple random sampling technique, while the four semi-intensive farms are the only ones existing in the area, hence they constitute the population. The majority of these farms grow maize, lucerne, wheat and barley mainly for the production of animal feedstuff.

A questionnaire-based survey with in-person interviews was conducted in order to collect data concerning infrastructure (buildings, machinery equipment), land, livestock capital, human labour and variable capital (forages and concentrates, veterinary services, fuel etc.) (Ziogas *et al.*, 2001). Moreover, the quantities of crop and animal products are recorded as well as the producer prices.

The collected data were analysed in order to evaluate advantages and disadvantages of each system. The technical and economic indicators presented in the remainder of this paper were calculated using the primary data of the survey. They are more reliable as they take into account differences in flock sizes among farms (Papadimitriou, 2005) and they readily permit comparisons among the different production systems under consideration.

An one-way weighted ANOVA was used to analyse the data using version 8.0 of the JMP software (SAS Institute Inc, Cary, North Carolina). A multiple comparisons for all pairs of means were performed using Tukey–Kramer HSD. The significance level was set to $P < 0.05$ (Steel and Torrie, 1980).

III – Results and discussion

Capital expenses of the intensive and the semi-intensive system were significantly higher than those of the semi-extensive (Table 1). For the semi-extensive system they were only 166.8 €/ewe while they were calculated to 309.8 €/ewe for the semi-intensive and to 285.9 €/ewe for the intensive one.

Table 1. Capital cost shares per sheep by farming system

Capital costs	Farming system						p-value
	Semi-extensive		Semi-intensive		Intensive		
	€/ ewe	SD	€/ ewe	SD	€/ ewe	SD	
1.Fixed capital	61.9 ^b	33.1	137.0 ^a	51.3	116.3 ^a	45.2	***
2.Variable capital	104.9 ^b	26.0	172.8 ^a	69.4	169.6 ^a	61.9	***
Purchased feedstuff	39.3 ^b	29.0	15.7 ^b	10.7	80.0 ^a	45.5	***
Veterinary expenses	7.5 ^b	5.7	8.8 ^{ab}	2.9	12.3 ^a	5.2	*
Crop production expenses	41.8 ^b	26.2	127.8 ^a	70.2	56.3 ^b	48.5	***
Other expenses	16.3	7.1	20.5	7.8	21.0	11.7	NS
Total	166.8 ^b	49.8	309.8 ^a	98.3	285.9 ^a	83.6	***

*P<0.05, **P<0.01, ***P<0.001, NS: not significant. SD: standard deviation.

Means in the same column followed by the same letter are not significantly different (P≤0.05).

A similar trend was found for both constant and variable capital expenses (Table 1). Fixed capital costs account for 37.1%, 44.2% and 40.7% of the total costs of the semi-extensive, semi-intensive and intensive farming systems respectively. Differences in fixed capital are related to the considerably higher investments in infrastructure and equipment of the intensive and semi-intensive systems (De Rancourt *et al.*, 2006). This finding was expected, as these systems use modern building infrastructure for their flocks and state-of-the-art machinery equipment (milking machines, etc).

Intensive and semi-intensive farming systems also exhibit significantly higher variable costs, 169.6 €/ewe and 172.8 €/ewe respectively, compared to the semi-extensive farming system (104.9 €/ewe). Variable costs of the former system are heavily burdened with purchased feedstuff (80.0 €/ewe, 47.2% of total variable costs) (Table 1), while the variable costs of crop production for forages (seeds, fertilizers, pesticides, fuel) (127.8 €/ewe, 73.9%) constitute the main factor accounting for the total variable costs of the semi-intensive system. Note, however, that only a part of crop products is consumed on-farm as feedstuff; the remaining quantities are sold in markets.

Taking into account that feeding expenses constitute the major part of the variable costs for the semi-intensive and the intensive sheep farming systems, it is interesting to examine the sources of these costs (Table 2). Intensive farms base animal diet mainly on concentrates (67.7%) and other purchased feedstuff, which increase feeding costs. According to Morand-Fehr *et al.* (2007) this is the usual feeding practice in the intensive sheep farming systems. On the other hand, cost of purchased feeds is found to be significantly lower in both the semi-extensive and the semi-intensive systems than that of the intensive one, as sheep feeding requirements are covered partially by grazing (De Renobales *et al.*, 2012). Furthermore, the high percentage of on-farm produced forages further reduces the feeding cost in the semi-intensive systems.

IV – Conclusions

Considering the findings of the descriptive analysis presented above, it can be argued that the semi-extensive sheep farming system is less vulnerable to volatile conditions in the general economic environment, as it is less capital-demanding than the other two under consideration. Comparing the remaining two systems, variable capital costs of the intensive farming system are high mainly because of the high cost of purchased animal feeds. Similarly, the variable cost of the semi-intensive farming system is high but this is due to the high production costs of

fodder crops. However, the feeding costs of the semi-intensive system are lower compared to those of the intensive one. Consequently, the sustainability of the intensive system is limited, as funds continue to be scarce. Hence, it seems that the current economic crisis affects mainly the intensive system, as farms of this type are more dependent on capital. A general recommendation for all three systems would be to rationalize the management of feeding.

Table 2. Feeding cost per sheep by farming system

Animal feeds	Farming system						p-value
	Semi-extensive		Semi-intensive		Intensive		
	€/ ewe	%	€/ ewe	%	€/ ewe	%	
Roughages	29.2 ^b	38.3	29.6 ^{ab}	37.8	39.9 ^a	32.3	*
Concentrates	47.0 ^b	61.7	44.1 ^b	56.4	83.6 ^a	67.7	***
Forages	0.0	0.0	4.5	5.8	0.0	0.0	***
Total	76.2 ^b	100	78.2 ^b	100	123.5 ^a	100	***

*P<0.05, **P<0.01, ***P<0.001, NS: not significant.

Means in the same column followed by the same letter are not significantly different (P≤0.05).

References

- De Rancourt, M., Fois, N., Lavin, M.P., Tchakerian, E. and Vallerand, F., 2006. Mediterranean sheep and goats production: An uncertain future. In: *Small Ruminant Research*, 62: 167-179.
- De Renobales, M., Amores, G., Arranz, J., Vitro, M., Barron, L.J.R., Bustamente, M.A., Ruiz de Gordo, J.C., Najera, A.I., Valdivielso, I., Abilleira, E., Beltran de Heredia, I., Perez-Elortondo, F.J., Ruiz, R., Albisu, M. and Mandaluniz, N., 2012. Part-time grazing improves sheep milk production and its nutritional characteristics. In: *Food Chemistry*, 130: 90-96.
- FAO, 2008. High-level conference on world food security: The challenges of climate change and bioenergy. Soaring food prices: facts, perspectives, impacts and actions required. Rome
- Hadjigeorgiou, I., Vallerand, F., Tsimpoukas, K. and Zervas, G., 1999. Socio-economic situation of the sheep and goat livestock in Greece and prospects for the future development. In: Laker, Milne (Eds.), *Livestock Production in the European LFAs*. MLURI, pp17-23.
- Hellenic Statistical Authority (HSA), 2000. Distribution of the Country's area into basic categories of land use. <http://www.statistics.gr> (accessed 10/2/2011).
- Morand-Fehr, P., Fedele, V., Decandia, M. and Le Frileux, Y., 2007. Influence of farming and feeding systems on composition and quality of goat and sheep milk. In: *Small Ruminant Research*, 68: 20-34.
- Papadimitriou G., 2005. *Descriptive Statistics*. Typothito Publications, Athens, Greece. (In Greek)
- Tsiboukas K., 2006. The future of ruminants farming in the new CAP. In: *Journal of Animal Science*, 31: 33-52. (In Greek, English summary).
- Steel R.G.D. and Torrie J.H., 1980. *Principles and Procedures of Statistics*. 2nd edition. McGraw-Hill, New York, 481 pp.
- Ziogas, X., Kitsopanis, G., Panapanagiotou, E. and Kanteres, N., 2001. *Comparative technoeconomical analysis of sheep and goat farming in Greece*. ZITI publications, Thessaloniki, Greece (in Greek).