

Extended Abstract

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Poster Title	Economic performance of dairy sheep farms in less-favoured areas of Greece: A comparative analysis based on flock size and farming system
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Abstract prepared for presentation at the 96th Annual Conference of the Agricultural Economics Society, K U Leuven, Belgium

4th – 6th April 2022

Abstract	<i>200 words max</i>
<p>Dairy sheep farming is a significant agricultural sector in Mediterranean countries providing income and employment opportunities in less-favoured areas (LFAs). The objectives of the present study were to evaluate the economic performance of dairy sheep farms in LFAs of Greece and perform a comparative analysis based on flock size and farming system. A random sample of 19 dairy sheep farms was used. Farm technical (flock size, production, grazing and nutritional management) and economic (subsidies, variable costs and prices) data were collected using a designated questionnaire. Economic performance of farms was estimated using iSAGEDSS, a decision support system for small ruminant farming. Estimated economic parameters were then analysed by flock size (≤ 150 ewes vs > 150 ewes) and farming system (intensive/semi-intensive vs semi-extensive). Approximately 37% of farms were operating with losses. Feeding contributed the most to total variable costs (ca. 84%). Moreover, ewes produced 50 kg less milk/milking period than expected based on nutritional management. Smaller and semi-extensive farms had significantly ($P < 0.01$) lower total variable costs (ca. 50%) and lower income (ca. 60%). In semi-extensive farms, feed costs/ewe were also lower (ca. 50%). Finally, a significantly ($P < 0.05$) negative average gross margin was reported for smaller farms compared to larger ones.</p>	
Keywords	Dairy sheep farming, Less-favoured areas, Economic performance, Flock size, Farming system
JEL Code	Q12 Micro Analysis of Farm Firms, Farm Households, and Farm Input Markets see: www.aeaweb.org/jel/guide/jel.php?class=Q)
Introduction	<i>100 – 250 words</i>
<p>Globally, small ruminants' population is slightly more than 2 billion and approximately 98 million heads are reared in Europe. Dairy sheep farming plays an essential role in the national economy of Mediterranean countries offering job opportunities and income for families, especially in less-favoured areas (LFAs) where alternatives are limited. Moreover, it contributes to the development and growth of small local dairy industries and other facilities, enhancing life perspectives and promoting the economy in remote areas. Greece has the second largest dairy sheep population in the EU, comprising 8.3 million animals. The majority of this population is reared in LFAs accounting for 7.2% of the gross value of agricultural production. However, the sector faces many</p>	

economic challenges, which threaten its viability. In this regard, economic performance and factors associated with profitability of dairy sheep farms are of significant interest for LFAs. Several studies have been performed on this topic. In Greece, however, such studies were farming system specific. Moreover, comparative economic studies in relation to important farm parameters is scarce; comparisons have only been made based on flock size in transhumance farms. Hence, the objective of the present study was two-fold; (i) to evaluate the economic performance of dairy sheep farms located in LFAs of north-western Greece and (ii) to conduct a comparative economic analysis clustering the farms by flock size and farming system.

Methodology

100 – 250 words

A random sample of 19 dairy sheep farms located in LFAs of north-western Greece (region of Florina) was used. The average farm comprised 174 ± 61.0 ewes with an average milk yield of 218 ± 88.7 kg/milking period. Reared ewes were crossbreeds of Lacaune or Assaf breeds with indigenous Greek sheep breeds. Technical and economic data of the farms were collected by a group of veterinarians using a designated questionnaire. Technical data included flock size, production (milk and meat), grazing and nutritional management (forage and concentrate feedstuffs) parameters. Economic data included information on subsidy income, variable costs (feeding, labour, transportation, utility, renting, veterinary and grazing land costs) and prices for milk, meat and feedstuffs. Collected data from each farm were inputted in the web application iSAGEDSS, a decision support system for small ruminant farming, in order to estimate their economic performance and assess the impact of nutritional management on ewe productivity; farm income, variable costs, gross margin and the estimated difference on milk production based on energy and protein balance were calculated. To detect potential differences on economic performance parameters, selected farms were divided by flock size and farming system into the following groups: (i) ≤ 150 ewes ($n=8$) and (ii) >150 ewes ($n=11$) and (i) intensive/semi-intensive farms ($n=8$) and (ii) semi-extensive farms ($n=11$), respectively. Data were analysed with one-way ANOVA using R statistical package “stats”.

Results

100 – 250 words

The average farm income, variable costs and gross margin were $53,286.3 \pm 32,671.10$ €, $46,374.6 \pm 22,538.17$ € and $6,911.7 \pm 15,460.85$ €, respectively; gross margin per ewe was 24.3 ± 61.43 €. However, results showed that 36.8% of farms were operating with losses with an average total gross margin and gross margin/ewe of $-5,464.9 \pm 3,561.54$ € and -34.2 ± 20.04 €, respectively. Income was mostly based on milk production, followed by meat production and subsidies ($58.3 \pm 9.95\%$, $22.5 \pm 10.35\%$ and $19.2 \pm 10.69\%$, respectively). Feeding was the most important element of variable costs ($83.6 \pm 8.91\%$), followed by transportation ($5.6 \pm 5.95\%$), renting ($3.0 \pm 3.95\%$), veterinary ($2.6 \pm 1.43\%$), utility ($2.3 \pm 2.42\%$), milking parlour ($1.1 \pm 1.32\%$), grazing land ($1.0 \pm 1.37\%$) and labour costs ($0.9 \pm 2.73\%$). According to nutritional management assessment the average farm should have a higher milk production by 50.0 ± 17.81 kg/ewe/milking period, that would result in a higher gross margin by 50.9%. Significant differences ($P < 0.05$) on economic performance were reported in relation to flock size and farming system. Smaller farms had significantly ($P < 0.01$) lower variable costs, but also lower income compared to larger ones (by

27,993.6±8,368.41€ and 41,982.4±11,846.54€, respectively). This resulted in a significantly ($P<0.05$) negative average gross margin (-1,187±4,997.31€) for smaller farms, despite having less costs for utility (by 2.6±0.97%) and being more dependent on subsidies (by 6.8±4.83%). Moreover, significantly ($P<0.01$) lower income and variable costs were reported in semi-extensive compared to intensive/semi-intensive farms (by 42,618.6±11,712.15€ and 29,581.7±8,040.62€, respectively). In the former farms, feeding accounted for a significantly ($P<0.01$) higher percentage of total costs (by 10.6±3.40%), however, feed costs per milked ewe were lower (by 47.9±22.00€). No significant ($P>0.05$) differences between farming systems were reported for gross margin.

Discussion and Conclusion

100 – 250 words

Results showed that a high percentage of the studied dairy sheep farms in LFAs of Greece (37%) were copying with economic losses. This finding could be explained by irrational nutritional management in relation to animal productivity. Specifically, feeding highly contributed to variable costs (84%), resulting in high expenses. Moreover, ewes produced less milk (50 kg/milking period) than expected based on nutritional management, reducing gross margin. According to comparative analysis, smaller farms had lower gross margin (by 109%), compared to larger ones. Given that smaller farms had lower variable costs and higher income from subsidies, the reported difference in gross margin may be attributed to lower income from milk sales; smaller farms produced 30% less milk/ewe. Such results may indicate poor management and animal welfare status. Likewise, semi-extensive farms had significantly lower income compared to intensive/semi-intensive farms, which could be also explained by differences in milk production (43% less milk/ewe). However, the lower variable costs, and especially feed costs/ewe, reported in semi-extensive farms resulted in no differences regarding gross margin. This finding is in accordance with such systems relying on grazing for meeting animal nutritional needs and not prioritising other investments. Overall, results suggest that dairy sheep farms in LFAs of Greece could economically benefit by increasing flock size, while also adjusting nutritional management according to animal productivity. This research has been co-financed by the European Regional Development Fund of the European Union and Greek National Funds through the Operational Program Western Macedonia 2014-2020 (project code: DMR1-0016238).