Assessing efficiency of meat sheep farms in the UK by performance evaluation and benchmarking

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Application Efficiency analysis serves as a useful tool for revealing best management and production practices. Efficient sheep farms have large flocks, utilize economies of scale, depend on home-grown feed and use infrastructure at full capacity

Introduction Sustainable economic performance of sheep farms is associated with improved production techniques and effective management practices. Productivity and competitiveness of the sheep sector can be enhanced and strengthened through the adoption of "best farm practices" and innovations. Technical efficiency (TE) (Fried et al., 2008) is related to producers' management capacity and it is a useful tool for identifying best-practicing producers and benchmarking the performance of the rest against the top performing. The objective of this study was to estimate TE of sheep farms in the UK, to describe the structure and the profile of "best practicing farms" and to identify the characteristics of a production system that achieves highest economic performance.

Material and methods Technical and economic data collected from 119 meat sheep farms in the UK were used. The TE level of these farms was estimated by Data Envelopment Analysis (DEA) to identify the relatively efficient ones. The inputs used in the DEA model were: (i) flock size (number of ewes), (ii) human labour (hours), (iii) variable cost (€) and (iv) fixed capital cost (€). The output variable was gross revenue (€). Studied farms were categorized according to their TE level; their main technical and economic characteristics were calculated and compared.

Results The results showed that 22/119 farms are relatively fully efficient and that the mean TE level of studied farms was 77.3%. Hence, there is a considerable margin of approximately 23% to increase value of production of these sheep farms in the UK, providing that they adopt best observed practices. The composition of gross revenue showed that their output was dominated by sales of lambs for breeding and meat production that contributed 43.74% and 38.74%, respectively. Involuntary culling of animals accounted for 14.67% of gross revenue, while contribution of wool was marginal; only 2.85%. A key characteristic of the efficient farms is that they have comparatively larger flocks and manage human labour effectively, utilizing economies of scale (Table 1). Moreover, infrastructure was used at full capacity in efficient farms leading to considerable decrease of fixed costs per animal. However, it was revealed that less efficient farms had higher meat production per ewe. Although there were not significant differences in gross revenue between the two groups, efficient farms achieved higher gross margin (82 *vs.* 73 €/ewe).

Table 1. Economic characteristics of relatively efficient and inefficient farms

Economic data	Farm group		Average farm (TE = 0.773)
	Efficient (TE = 1.000)	Inefficient (TE = 0.722)	
Labour cost (€/ewe)	24	35	32
Feed cost (€/ewe)	15	20	19
Variable Capital cost (€/ewe)	45	47	46
Fixed Capital cost (€/ewe)	48	68	64
Production cost (€/ewe)	131	170	161
Gross revenue (€/ewe)	142	140	140
Gross margin (€/ewe)	82	73	75

Conclusion The measurement of efficiency and the description of the structural and economic characteristics of efficient meat sheep farms in the UK could be a practical tool for identifying best practices and management strategies to improve economic performance. Efficient farms utilize poorer land, rely mainly on grazing, have "easier care" ewe breeds which are lambing outdoors and often sell meat directly to consumers.

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