UMR Herbivores

Team Design, Modelling and Evaluation of Herbivore farming Systems (COMETE)

Optimising economic and environmental performances of sheep-meat farms does not fully fit with the meat industry demands

Ruminant farming systems are questioned for their contribution to climate change and feed-food competition. Here, we analyse the economic and environmental performances of five sheep farming systems optimised in terms of ewe productivity and feeding costs. Systems are located in contrasting biogeographical areas along a gradient of decreasing agronomic potential from Ireland to the French Mediterranean rangelands.

Applying a mechanistic model of flock and farm operation management to evaluate these five systems made it possible to highlight trade-offs between their economic performance under standardised economic conditions, environmental performances, and feed-food competition, but also discrepancies between sheep farm strategy and meat industry demands.
Different management strategies resulted in ewe productivity ranging from 0.82 to 1.66 lambs ewe^{-1} year^{-1} between farming systems and concentrate use from 0 to 148 kg ewe^{-1} year^{-1}. The two systems relying the most on grassland and rangelands show the best economic and environmental performances while minimising feed-food competition. This results from a good match between animal feed requirements and forage availability; these systems, however, generate a high seasonality of production that does not meet the industry demand for a regular meat supply throughout the year.

The Irish system also follows a forage autonomy strategy, but with poorer environmental and economic performance due to intensification, higher price of land, and lower meat price. Both the accelerated reproduction system with three lambing periods in two years and the organic system generate a more regular lamb supply, but require a higher level of concentrate feed, which negatively affects performances.
These results highlight for the first time that optimising economic and environmental performances at farm level does not fully fit with the meat industry demand for a regular lamb meat supply throughout the year and lamb conformation. Low-productivity but fully self-sufficient fodder livestock systems can achieve excellent economic performance, but require both specific skills and marketing adequacy.

Keywords
Ruminants. Farming system. Feed-food competition. Modelling. Trade-offs. Agroecology. Organic farming. Pastoralism

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