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# Modeling animal performance under infectious and non-infectious challenges: The case of Chios sheep



Alexandros Theodoridis and Georgios Arsenos

School of Veterinary Medicine, Aristotle University of Thessaloniki, Greece

## Challenge

✓ **The development of new genetic traits** is expected to increase resistance to infectious and non-infectious diseases and improve **resilience and sustainability** of sheep and goat farms

## Objective

✓ **Simulate economic performance** of sheep and goat farms under new resilient and efficient traits that counteract presence of infectious and non-infectious diseases.

## Approach

- Mathematical **linear programming model** maximizing Gross Margin under a set of constraints
- Impact of **mastitis** and **gastro-intestinal nematode (GIN) parasites** on farm profitability
- Technical and economic data from **Chios sheep farm**
- **Two scenarios** assessed: Presence of diseases in farm VERSUS Disease-free farm

Farm & Economic Indicators	Disease Plan	Disease-free Plan
Sheep (heads)	643	642
Land (irrigated land & rangeland in ha)	45.16	45.16
Labor (hours)	8,500	8,500
Milk (Kg sold to dairies)	95,039	103,450
Cheese (Kg)	11,637	12,667
Lamb meat (Kg)	12,538	12,529
Ewe meat (Kg)	3,046	3,212
Gross revenues/farm (€ per ewe)	242,094 (376.5)	257,700 (401.4)
Variable capital/farm (€ per ewe)	46,595 (72.5)	46,176 (71.9)
Gross margin/farm (€ per ewe)	195,499 (304)	211,524 (329.5)

## Key findings - Conclusions

- ✓ The structure of the farm does not change significantly if new resilient and efficient animal traits are developed to prevent diseases.
- ✓ The impact of diseases is not considered important to impose the farmer change the management plan.
- ✓ The development of resilient animals is not considered a groundbreaking issue for the farmers.
- ✓ The gross margin is increased in the disease-free scenario; however, it does not affect the managerial decisions of the farmer.



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<https://www.smarterproject.eu/>  
[alextheod@vet.auth.gr](mailto:alextheod@vet.auth.gr)