



Innovation for Sustainable
Sheep and Goat
Production in Europe

The iSAGE project: Overview

Georgios Arsenos

Professor, Department of Veterinary Medicine,
Aristotle University of Thessaloniki, Greece

iSAGE coordinator



The Consortium

- iSAGE deals with the **less developed** livestock sector in the EU
- iSAGE has all the major players in small ruminant sector

Approximately **16,000** sheep and goat farmers (**5.5 million** sheep and goats)



iSAGE philosophy:



Farms



Farmer



Animal



Processors

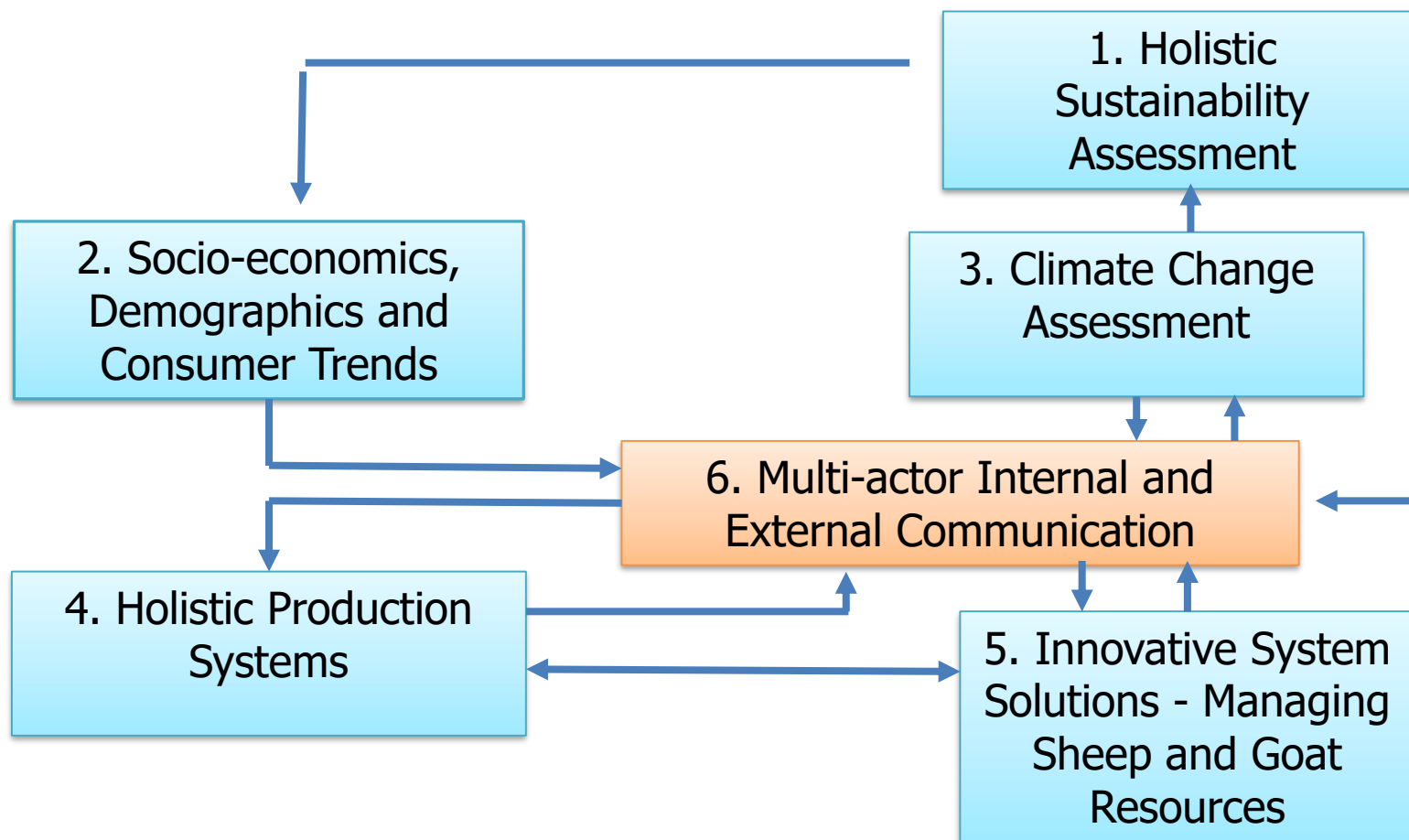


Consumers



Policy makers

iSAGE working platform



iSAGE aims

- **Increase/improve** efficiency, profitability, overall sustainability and innovative capacity of the sector
- **Find** new efficiency traits of animals/more adapted to environmental changes
- **Increase/improve** animal welfare, social well-being and rural development
- **Increase/enhance** consumer acceptance, societal acceptance
- **Identify/implement** innovations and **develop policy recommendations**

What iSAGE did?

Qualitative techniques

- Case studies
- Semi structured and structured interviews
- Focus groups
- Laddering surveys



What iSAGE did?

Quantitative techniques

- Farm level surveys
- **Recording impacts** of new innovations on farms
- **Modelling** expected climate impacts
- **Modelling** how management can improve ecology and farm productivity
- **Assessing** the **genetic potential** of sheep and goat populations for **future breeding programmes**
- New **decision support tools**

iSAGE outputs

- Interviews for **retailer surveys**
- **Three case studies** per country on selected supply chains
- **New modelling methods** to promote sustainability and resilience to climate change -**Pasture productivity** statistical model
- Implementation of **innovation case studies** in different countries
- Development of a **toolbox**
- Development and testing of a new **iSAGE farm model**
- Development and testing of **iSAGE-DSS**

iSAGE Technical and computational innovations for overall sustainability

- The **iSAGE Public Good tool (PG tool)**: sustainability scores in sheep and goat farms.
- A **picture of how the farm performs** with respect to a selection of 13 spurs (areas) that collectively contribute to sustainability.
- The PG tool **can motivate farmers to review their farming activity** considering other perspectives than purely economic ones (e.g. environmental impacts).

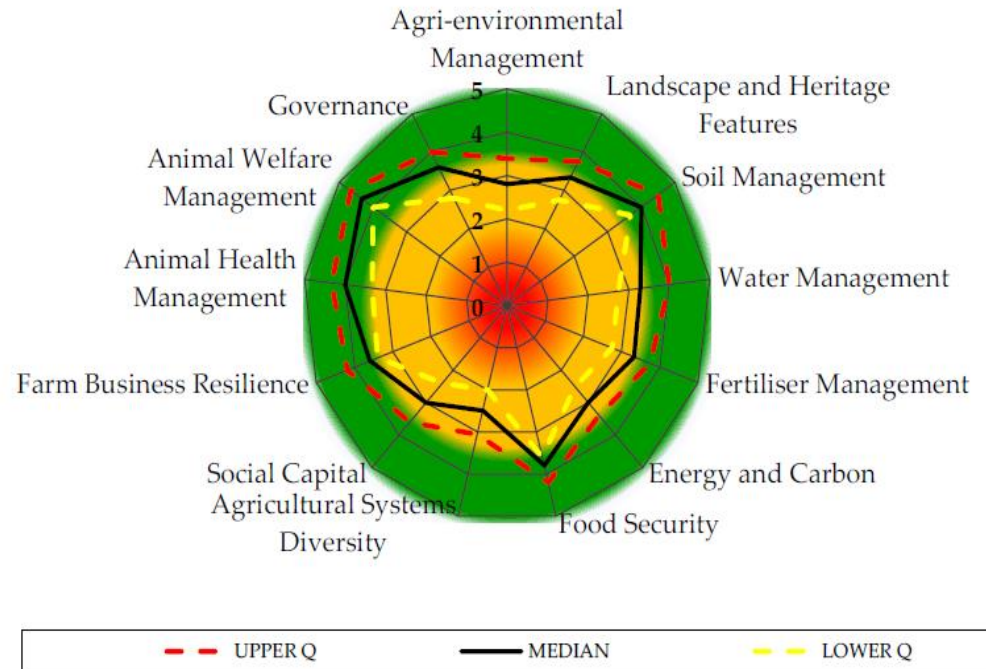


Figure 1. Upper, median and lower quartile values illustrate the strengths and weakness of the farm

iSAGE Technical and computational innovations for overall sustainability

- The **iSAGE-DSS**, which is a web-based, model-driven, decision support system for the efficient management of meat and dairy small ruminant farms.
- Farmers can make **annual management planning decisions** by testing future **what-if scenarios**.
- Farm income, variable costs and gross margin are estimated taking into account production estimates
- The **iSAGEDSS** provides comprehensible charts of **income and cost analyses** as well as bar plots of feed costs and variable costs per animal category

3
Total number of sheep

265
ANIMAL

3
Estimated weight change of milked ewes during

-0,970
KG

3
Estimated milk production change of milked ewes

-2,567
KG

Edit scenario

Quick navigation : Production Profit Financial Projections Detailed data

Scenario results

Milked animals	Energy Balance	Protein Balance	Weight Change
Lactation period	-0,16 MJ	50,90 g	-0,97 kg
Dry period	1,87 MJ	39,17 g	2,9 kg
Last month before birth	1,45 MJ	80,41 g	0,65 kg

Estimated milk production change of milked ewes considering energy and protein balance: -2,57 kg

Non milked animals	Energy Balance	Protein Balance	Weight Change
Non milked ewes	2,24 MJ	38,92 g	9 kg
Rams	1,70 MJ	66,85 g	8,3 kg
Lambs	0,6 MJ	14,57 g	0,23 kg

Gross margin

Gross margin

28.028,75€/year

Gross margin per ewe

136,73€/year

Gross margin excluding subsidies

22.968,75€/year

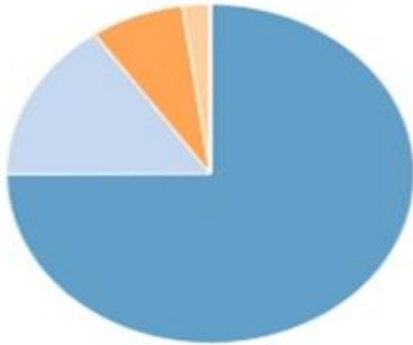
Gross margin per ewe excluding subsidies

112,4€/year

iSAGE-DSS report page with estimated gross margin (**with and without subsidies**) considering production estimates such as milk production change and weight change of lactating animals, based on their energy and protein balance.

Income

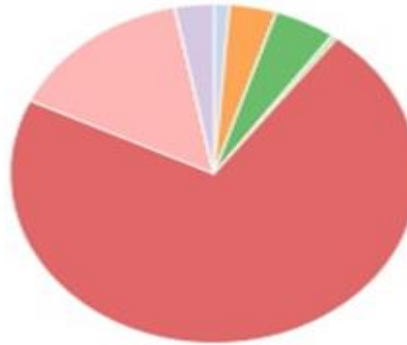
68250.2 €/year



Income from milk	51.158,54 €/year
Income from meat	10.531,66 €/year
Income from animal sales	1.500 €/year
Income from subsidies	5.060 €/year
Income from milk processed products	0 €/year
Income	68.250,20 €/year

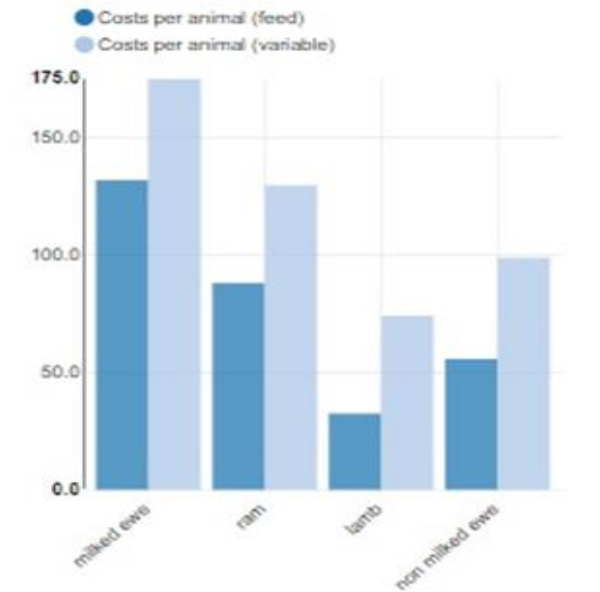
Costs

40221.45 €/year



Feed costs	28.876,45 €/year
Seasonal labour cost	200 €/year
Total costs of labour	5.960 €/year
Cost of renting	0 €/year
Farm running costs	1.500 €/year
Farm utility costs	1.950 €/year
Milking parlour costs	500 €/year
Processing costs	0 €/year
Veterinary costs	1.235 €/year
Grazing land costs	0 €/year

Costs per animal



Feed costs per lamb	32,47 €/animal
Feed costs per milked ewe	131,86 €/animal
Feed costs per non milked ewe	55,70 €/animal
Feed costs per ram	88,4 €/animal
Variable costs per lamb	74,12 €/animal
Variable costs per milked ewe	175,1 €/animal
Variable costs per non milked ewe	98,85 €/animal
Variable costs per ram	129,69 €/animal

iSAGE-DSS report page with a graphical representation of farm income & costs and costs per animal category

iSAGE outputs are used to:

- **Understand barriers** to innovation and sustainability

iSAGE outputs are used to:

- **Understand barriers** to innovation and sustainability **Innovation = profit**

iSAGE outputs are used to:

- **Understand barriers** to innovation and sustainability
- **Define future opportunities** for a competitive sheep and goat sector

iSAGE outputs are used to:

- **Understand barriers** to innovation and sustainability
- **Define future opportunities** for a competitive sheep and goat sector
- **Develop farm management tools** and innovative breeding strategies

iSAGE outputs are used to:

- **Understand barriers** to innovation and sustainability
- **Define future opportunities** for a competitive sheep and goat sector
- **Develop farm management tools** and innovative breeding strategies
- **Develop solutions** for social, welfare and consumer issues

iSAGE outputs are used to:

- **Understand barriers** to innovation and sustainability
- **Define future opportunities** for a competitive sheep and goat sector
- **Develop farm management tools** and innovative breeding strategies
- **Develop solutions** for social, welfare and consumer issues
- Work with industry to **inform, help** and **innovate**



Keys issues for discussion:

- **The sheep and goat Industry and researchers** should **continue** to work together to advocate for more sustainable systems. **Research** in technical key issues is necessary for production systems to adapt to changes and be more sustainable.
- **Profit** is the key for sheep and goat farmers. Sustainability needs to take into account 10-year (not 1-year) profitability.
- Farmer's believe that **the sector will not be viable** if the government decides to cut down on **subsidies**
- **Subsidies** using the current regime **did not help** towards increasing productivity or environmental sustainability.
- **Subsidies** should be based on production related figures, welfare indicators and reduction of GHG emissions – money should also be directed to educating farmers and implementing innovations on farms
- The sheep and goat sector need to adapt to regional government changes in **subsidies from direct to environmental support**

Keys issues for discussion:

- **Age structure is a major problem** in the sheep and goat sector and there is an urgent need for **new entrants** (young farmers).
- There is need for **improvement of the social acceptability/image** of the sheep and goat systems. A **better/more realistic public image** of farmers will probably help to recover the sinking levels of new entrants.
- **Education and knowledge exchange** are essential. iSAGE found that the latter have not been properly covered by institutions and governments. There is a critical need to educate and train farmers and shepherds to professionalise the sector and render it more attractive to young generations; currently is really difficult to find good shepherds.

Keys issues for discussion:

- The **small size of farms**, the **low education level** of farmers and their **mistrust to changes**, and the **very weak organisation** of the sector are barriers to innovation.
- There is a need for more **collaboration** between farmers for capacity building in participatory and other innovation transfer approaches (eg. Operational groups).
- Farmers are **reluctant to follow suggestions by veterinarians and adopt useful innovations to improve flock health.**

Keys issues for discussion:

- Farmers have always adapted to climate variability, but now we are also **facing huge social and economic challenges** that add complexity and more difficulties to adaptation to climate change.
- **The notion is that research for more resilient phenotypes and genotypes is important.** However, selecting for more resilient animals seem to be negatively correlated with increasing their production
- **Policies and Strategies to improve the environment** (reduce GHG and enhance biodiversity) require active collaboration with farmers to judge feasibility and ensure efficacy
- **iSAGE contributed to a video on CHG emissions** that is an important point to translate to decision makers.
- New calculations on the **reduced impact of Sheep and Goat systems on global warming** need to be taken into account by EU and regional governments.

Keys issues for discussion:

- iSAGE performed consumer and marketing studies. **Packaging, labeling and education/awareness** were raised as the most important factors that will make sheep and goat sector antifragile.
- There is much variability in **consumer reactions** regarding milk and meat products which needs to be taken into account.
- Sheep and goat products consumption is very seasonal around big religious feasts. **Marketing strategies should be developed and value chains adapted to them.**

iSAGE concluded that special emphasis should be given to:

- (i) **Supporting supply chains** and increasing consumption of sheep and goat products through novel labelling, packaging and cuts,
- (ii) **Coping with climate change** and greenhouse gas emissions using novel methodologies and technologies, and informing relevant policies,
- (iii) **Breeding** for enhanced animal resilience, efficiency and adaptability, and promoting region-specific use of local breeds,
- (iv) **Increasing the adoption of relevant innovations.** The efficient adoption of innovations is expected to increase the sector's overall resilience and sustainability and decrease reliance on public support.



Innovation for Sustainable
Sheep and Goat
Production in Europe

Thank you

