SOLID | Sustainable Organic and Low Input Dairying

Livestock production in Greece and the impact of the SOLID project

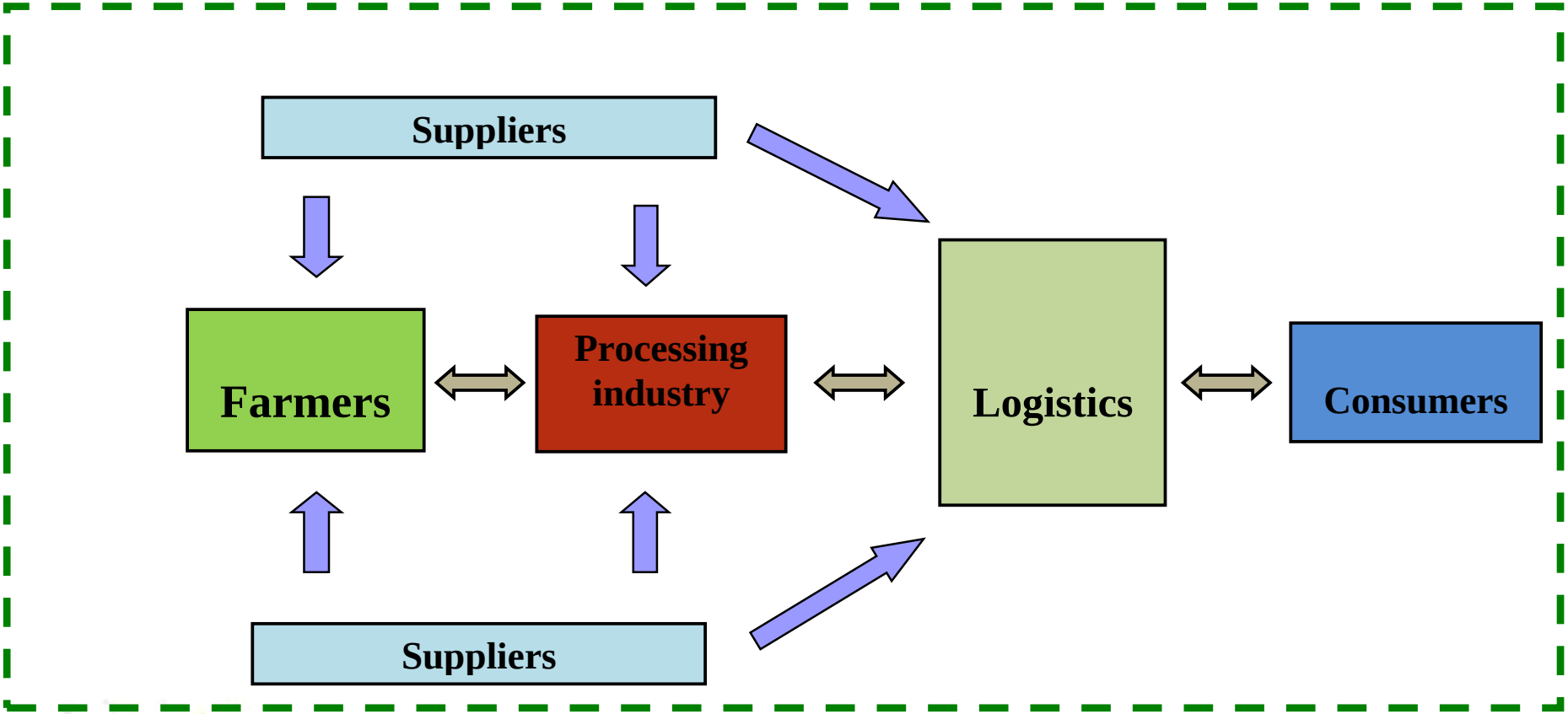
Georgios Arsenos

Aristotle University of Thessaloniki, Greece

Presentation overview

- Review of the current situation
- Production systems
- Main production limiting factors
- Scientific evidence as a driver for change
- Concluding remarks and Future trends

Livestock Production Framework



Ruminant Livestock in Greece

Animal species	Population
Dairy cows	117,971
Beef cattle	299,000
Sheep	9,747,325
Goats	4,562,684

What do we know about milk?

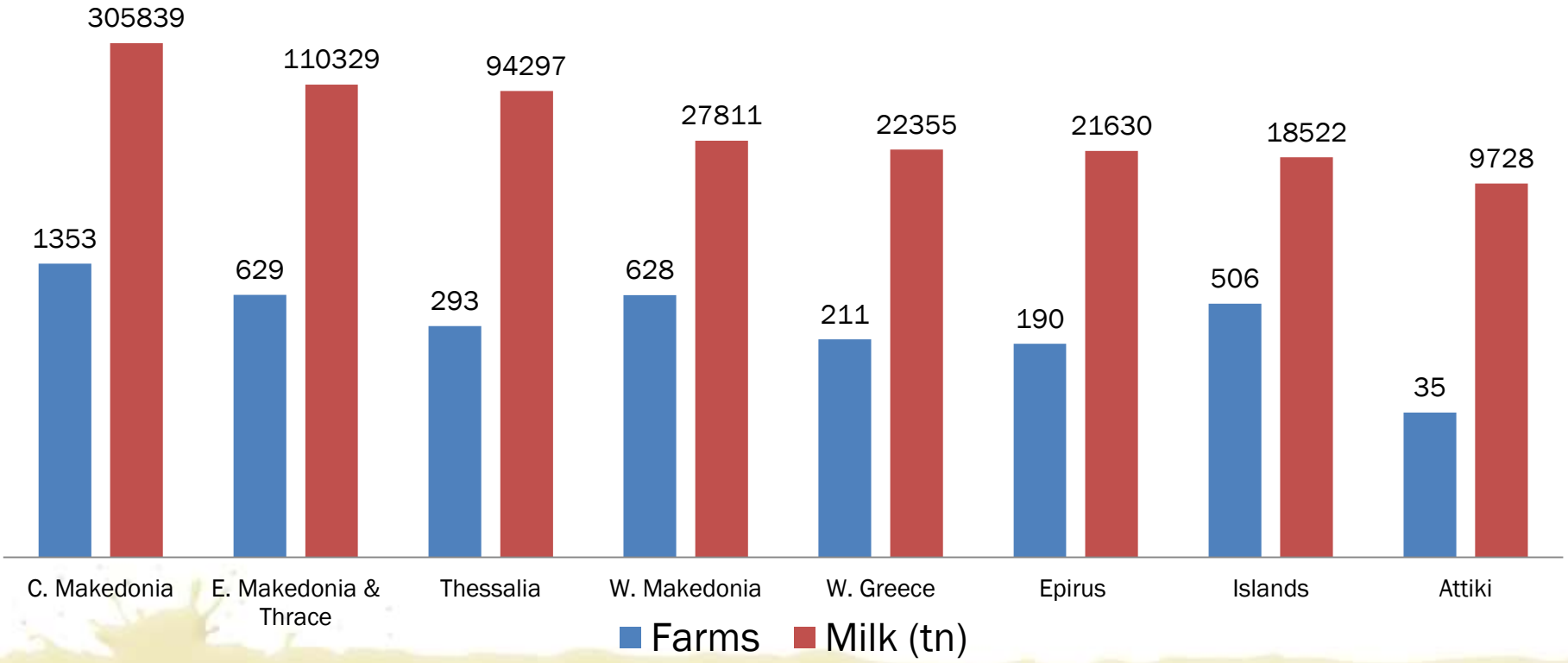
Milk production in Greece

Animal Species	Milk production (tones)	Coverage of national consumption
Cows	607,130	40%
Ewes	519,910	94%
Goats	123,337	100%

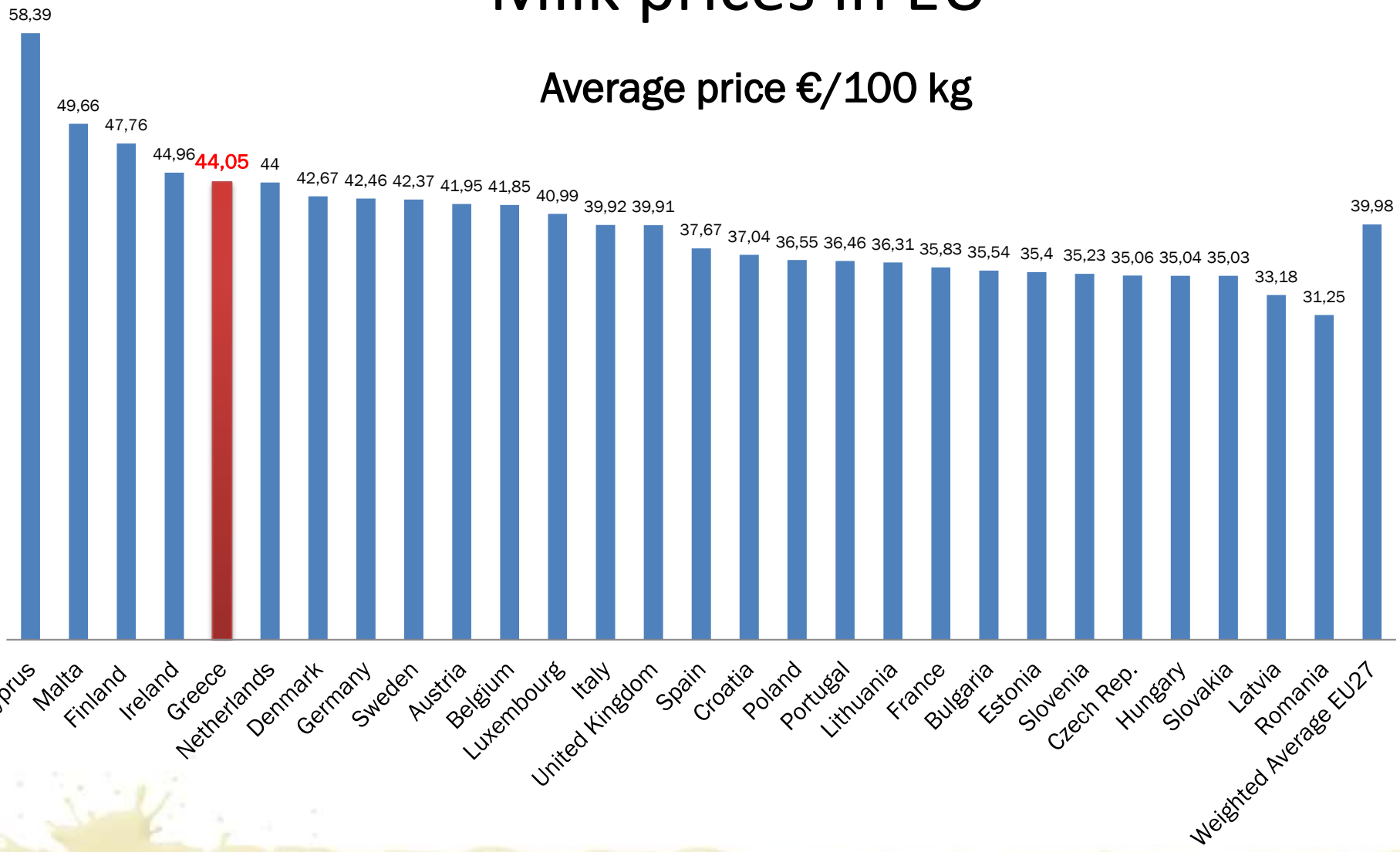
Dairy cows in Greece

- 117.971 cows
- 2.500 dairy farms

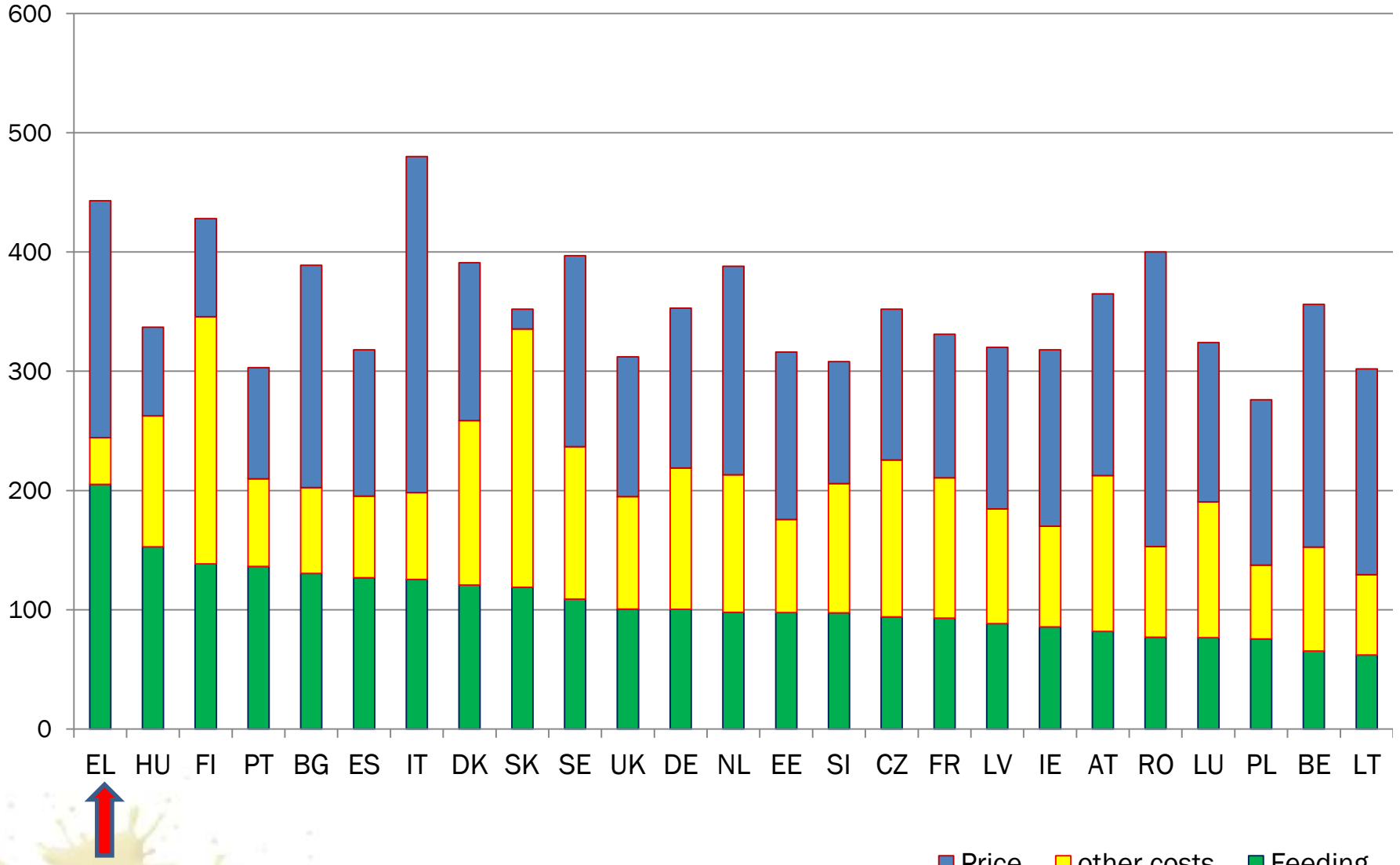
Number of farms and milk production/region



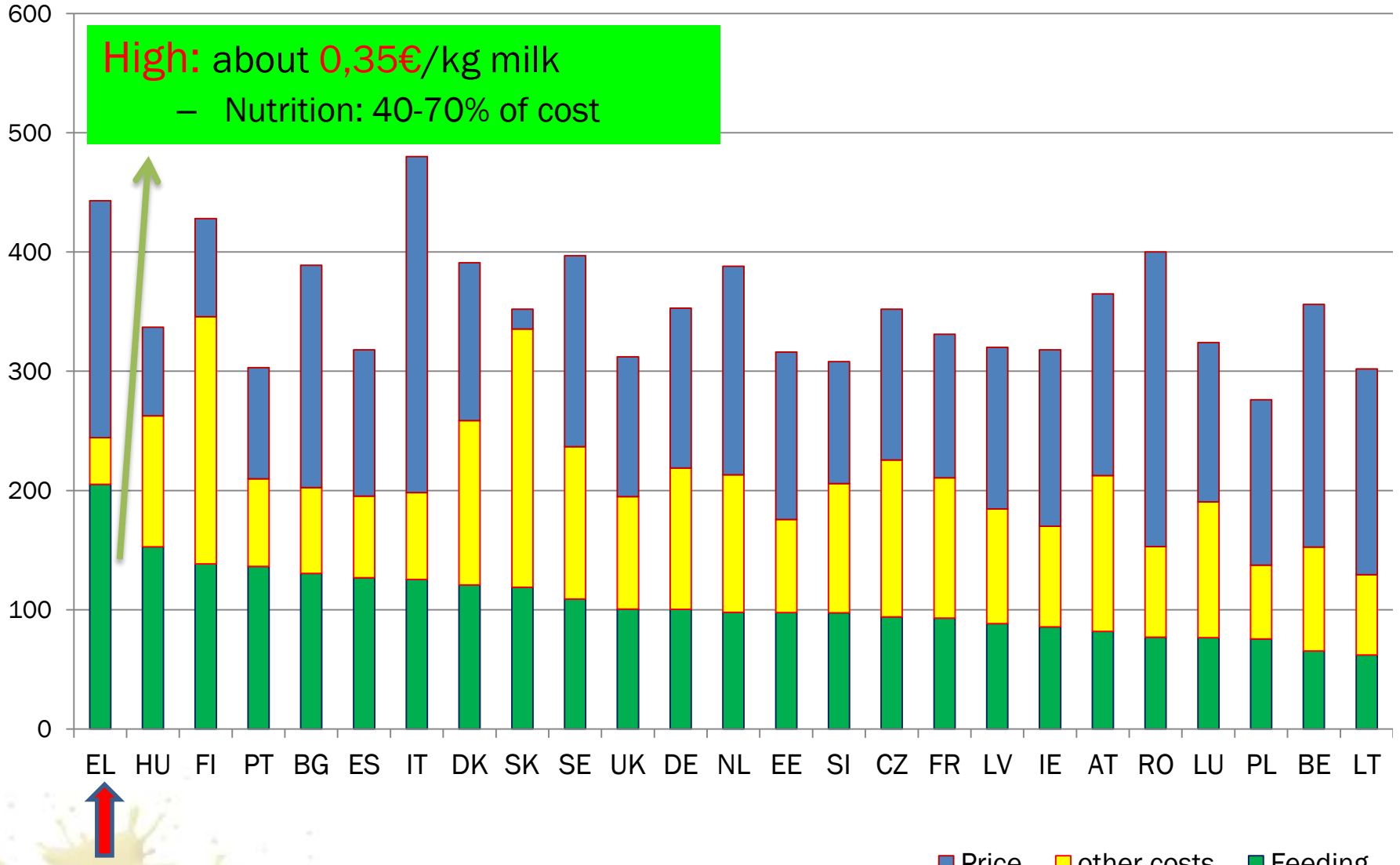
Milk prices in EU



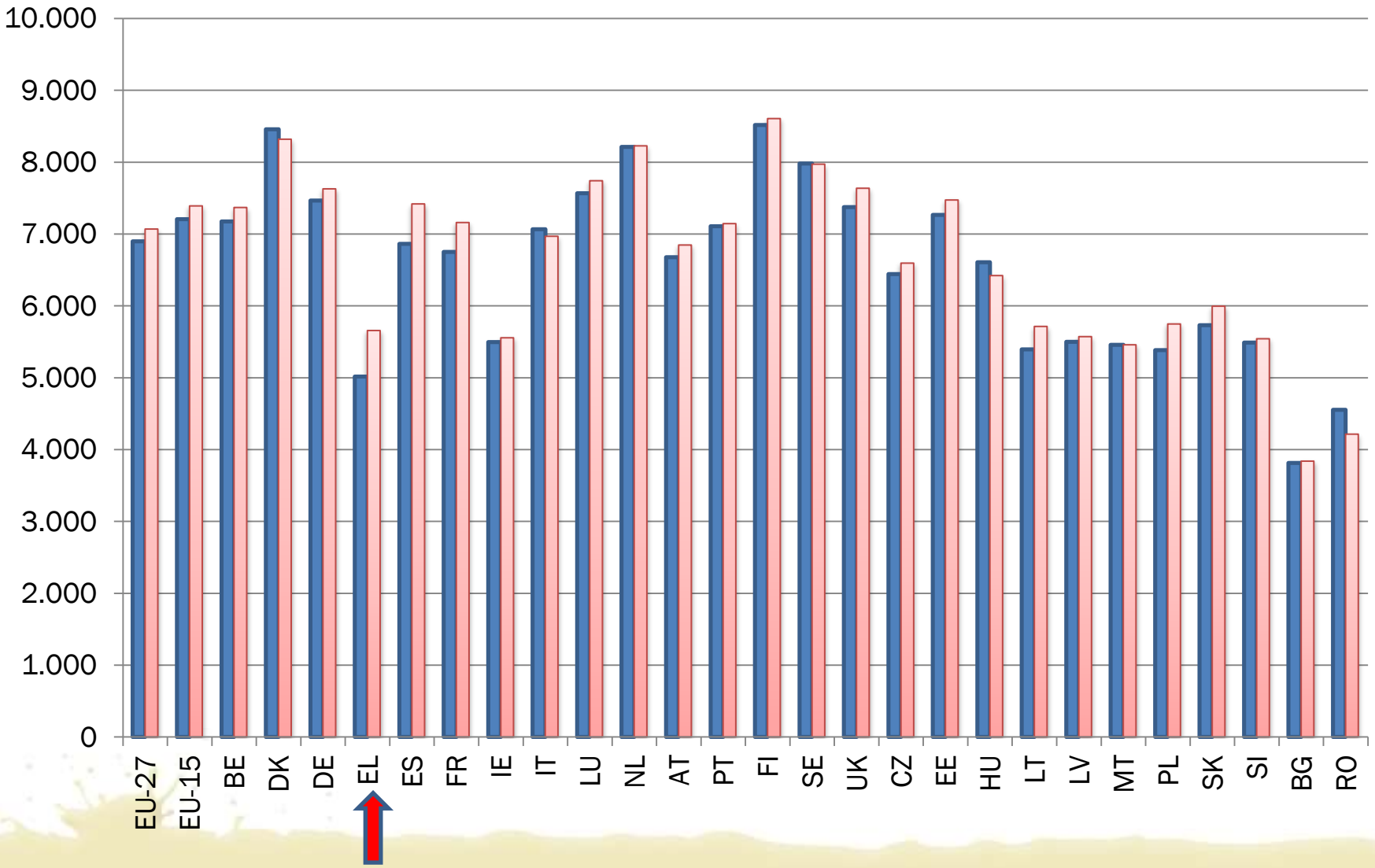
Costing of cow milk production in EU



Costing of cow milk production in EU



Milk production/cow/year



ΜΗΝΕΣ	ΠΟΣΟΤΗΤΑ ΣΕ ΤΟΝΟΥΣ	
	2013	2014
ΙΑΝΟΥΑΡΙΟΣ	51.184	53.451
ΦΕΒΡΟΥΑΡΙΟΣ	46.292	49.895
ΜΑΡΤΙΟΣ	54.225	56.488
ΑΠΡΙΛΙΟΣ	52.940	55.189
ΜΑΙΟΣ	53.626	55.803
ΙΟΥΝΙΟΣ	49.692	51.878
ΙΟΥΛΙΟΣ	50.868	52.016
ΑΥΓΟΥΣΤΟΣ	49.763	49.687
ΣΕΠΤΕΜΒΡΙΟΣ	47.890	46.248
ΟΚΤΩΒΡΙΟΣ	48.136	46.942
ΝΟΕΜΒΡΙΟΣ	48.744	45.169
ΔΕΚΕΜΒΡΙΟΣ	51.024	47.796
ΣΥΝΟΛΟ	607.313	619.335

ΜΗΝΕΣ	ΤΙΜΗ ΣΕ €	
	2013	2014
ΙΑΝΟΥΑΡΙΟΣ	0,4527	0,4599
ΦΕΒΡΟΥΑΡΙΟΣ	0,4473	0,4503
ΜΑΡΤΙΟΣ	0,4448	0,4456
ΑΠΡΙΛΙΟΣ	0,4428	0,4331
ΜΑΙΟΣ	0,4418	0,4333
ΙΟΥΝΙΟΣ	0,4435	0,4314
ΙΟΥΛΙΟΣ	0,4444	0,4277
ΑΥΓΟΥΣΤΟΣ	0,4473	0,4265
ΣΕΠΤΕΜΒΡΙΟΣ	0,4503	0,4279
ΟΚΤΩΒΡΙΟΣ	0,4528	0,4293
ΝΟΕΜΒΡΙΟΣ	0,4528	0,4319
ΔΕΚΕΜΒΡΙΟΣ	0,4530	0,4314
ΣΥΝΟΛΟ	0,4475	0,4352

ΜΗΝΕΣ	ΠΟΣΟΤΗΤΑ ΣΕ ΤΟΝΟΥΣ	
	2014	2015
ΙΑΝΟΥΑΡΙΟΣ	53.464	56.115
ΦΕΒΡΟΥΑΡΙΟΣ	49.959	47.521
ΜΑΡΤΙΟΣ	56.528	55.143
ΑΠΡΙΛΙΟΣ	55.398	52.686
ΜΑΙΟΣ	56.029	55.881
ΙΟΥΝΙΟΣ	52.204	49.051
ΙΟΥΛΙΟΣ	52.545	0
ΑΥΓΟΥΣΤΟΣ	50.175	0
ΣΕΠΤΕΜΒΡΙΟΣ	46.722	0
ΟΚΤΩΒΡΙΟΣ	47.628	0
ΝΟΕΜΒΡΙΟΣ	45.724	0
ΔΕΚΕΜΒΡΙΟΣ	48.658	0
ΣΥΝΟΛΟ	615.029	396.396

ΜΗΝΕΣ	ΤΙΜΗ ΣΕ €	
	2014	2015
ΙΑΝΟΥΑΡΙΟΣ	0,4519	0,4286
ΦΕΒΡΟΥΑΡΙΟΣ	0,4514	0,4275
ΜΑΡΤΙΟΣ	0,4481	0,4235
ΑΠΡΙΛΙΟΣ	0,4561	0,4288
ΜΑΙΟΣ	0,4528	0,4179
ΙΟΥΝΙΟΣ	0,4512	0,4147
ΙΟΥΛΙΟΣ	0,4292	
ΑΥΓΟΥΣΤΟΣ	0,4282	
ΣΕΠΤΕΜΒΡΙΟΣ	0,4286	
ΟΚΤΩΒΡΙΟΣ	0,4314	
ΝΟΕΜΒΡΙΟΣ	0,4337	
ΔΕΚΕΜΒΡΙΟΣ	0,4318	
ΣΥΝΟΛΟ	0,4475	0,4352

Dairy cattle production Over the last two years

-Number of farmers ↓ 4,2%

-milk production ↑ 1,18%

Sheep and Goat production in Greece

Milk is transformed into typical dairy products that have a regional or local connotation of origin and quality

Global view of dairy sheep production

1.1
Billion sheep

9.3
million tons of sheep milk

Current situation

	Dairy Sheep population	Milk production
World	1.2 Billion	9.2 million tons
Europe	13.2 million	3 million tons
Mediterranean region	**15.2 million**	**4 million tons**

Source: FAOSTAT

14 %

of world sheep population

46%

of world sheep milk

Current situation in Mediterranean countries

GREECE:
ITALY:
SPAIN:
FRANCE:

50.5%
of total sheep
milk production

+ TURKEY

68 %
of total sheep
milk production

Dairy sheep and goats are the most important group of ruminants in Mediterranean countries

Economic
Environmental
Sociological

} Importance

Characteristics of Dairy sheep and goats in Mediterranean

- Ability to forage and survive in many areas
- Management is generally linked to systems of natural resources (e.g. forage)
- Large diversity in terms of
  - genetic potential,
  - prolificacy
  - productivity
- EU policy had a major effect the industry (subsidies)

Production systems

- Traditional pastoral management systems
  - - Transhumance
- Semi extensive
- Semi intensive
- Intensive systems (great variation of intensiveness in different regions)

Animals are milked twice daily
over an average of 6 months milking period

Production systems

- **semi-extensive systems** are usually the only option for dairy sheep and goats in less favoured areas of Mediterranean countries

- In Greece and Spain, **intensive systems** are settling **in fertile plain areas.**

- In the mountainous Roquefort area (FRANCE), some farms tend to **zero grazing systems.**

Production systems: Diversity…

GREECE

From the **transhumance system** dominated by the use of mountainous small breeds to the **intensive systems** with high yielding indigenous breeds as well as foreign breeds.

ITALY

From **very intensive** irrigated farms in **lowlands** (12 ewes/ha), to **extensive pastoral** farms in **mountains** (2 ewes/ha)

SPAIN

From the small family cheese makers in **Basque** area (100 ewes) to the large milk producers in **Castilian** plateau (1000 ewes)

FRANCE

From the small family cheese makers in **Corsica** (100 ewes with 100 litres/ewe) to the intensive milk producers in **Roquefort** (500 ewes with 300 litres/ewe)

Some important issues

GREECE:

- Entire national flock of dairy sheep. Importation of **Assaf E** and **Lacaune** in large numbers
- Largest herd of dairy goats in Europe

ITALY: Dairy sheep is concentrated in Sardinia,

SPAIN:

- The sector is developing rapidly especially with the **ASAF_E** breed.
- Home to **Murciano granadina** goat (Imported in Greece in large numbers)

FRANCE:

- Localised production
  - Milk sheep raised in 3 regions (Roquefort, Atlantic Pyrenées & Corsica)
- **Well organised and technically supported production**
  - Milking machines and milk recording
  - **Controlled reproduction** by AI (500,000 ewes) and genetic selection

Facts on production

- Globalisation of milk products
- Increased competition
- Low level of specialisation

Limiting factors

- Production objectives
- Management practices and farmer skills
- Husbandry methods and strategic planning
- Knowledge exchange and implementation of novel technologies

SOLID | Sustainable Organic and Low Input Dairying

What do we know about meat?

Percentage of **produced meat** in relation to total **meat consumption** in Greece

	Year		
Animal Species	2012	2013	2014
Cattle	18,25%	18,12%	17,49%
Sheep& goats	81,85%	79,57%	76,23%
Total	31.67%	26,62%	29,05%

Source: Meat news

Beef cattle

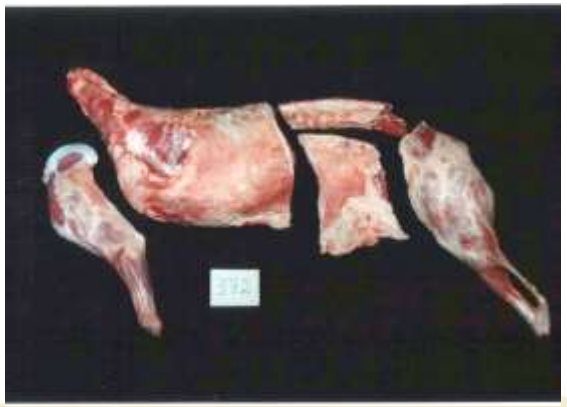
Greek National herd	299.000

Average carcass weight (kgs)

Greece	E.E. -25 countries	France
235,7	323,5	372,4
Difference to Greece	+87,8	+136,7

Meat from Sheep and Goats in Greece

- High production costs, limited market opportunities
- Average carcass weights for lambs and kids is 7-9 kg (lights carcasses)
- Seasonality in production
- Absence of packaging and processing methods
- **Great potential for exports**



Meat from Sheep and Goats in Greece

- High production costs, limited market opportunities
- Average carcass weights for lambs and kids is 7-9 kg (lights carcasses)
- Seasonality in production
- Absence of packaging and processing methods
- **Great potential for exports**

Οι εξαγωγές αιγοπρόβειου την πενταετία 2010-2014

	2010	2011	2012	2013	2014	ΜΕΤΑΒΟΛΗ 2014/2010 (%)
Αξία (ευρώ)	10.582.128	9.797.682	12.835.221	18.267.607	20.554.789	94,24
Ποσότητα (κιλά)	1.931.821	1.742.527	2.065.937	3.260.049	3.708.850	91,99

Πηγή: ΕΛΣΤΑΤ. Επεξεργασία στοιχείων Meat News

Exports doubled during the last 5 years

The impact of the solid project

Genetic and phenotypic characterization of dairy goat breeds perceived to be adapted to Low input conventional production systems



Research involved:

103 flocks
37,484 goats

Typology of Production systems of dairy goats in Greece

Extensive pastoral system
(8% of goats)

Semi-intensive
(82% of goats)

Intensive
(10% of goats)

First large database of phenotypic and genetic data of Greek goats

8,600 individual milk yield records

8,300 *records of milk quality (fat, protein, lactose, SNF, cells and TBC).*

1,350 milk samples from individual goats - cultured for pathogens such as CNS, Staphylococcus aureus, Streptococci spp, Listeria, Coliforms.

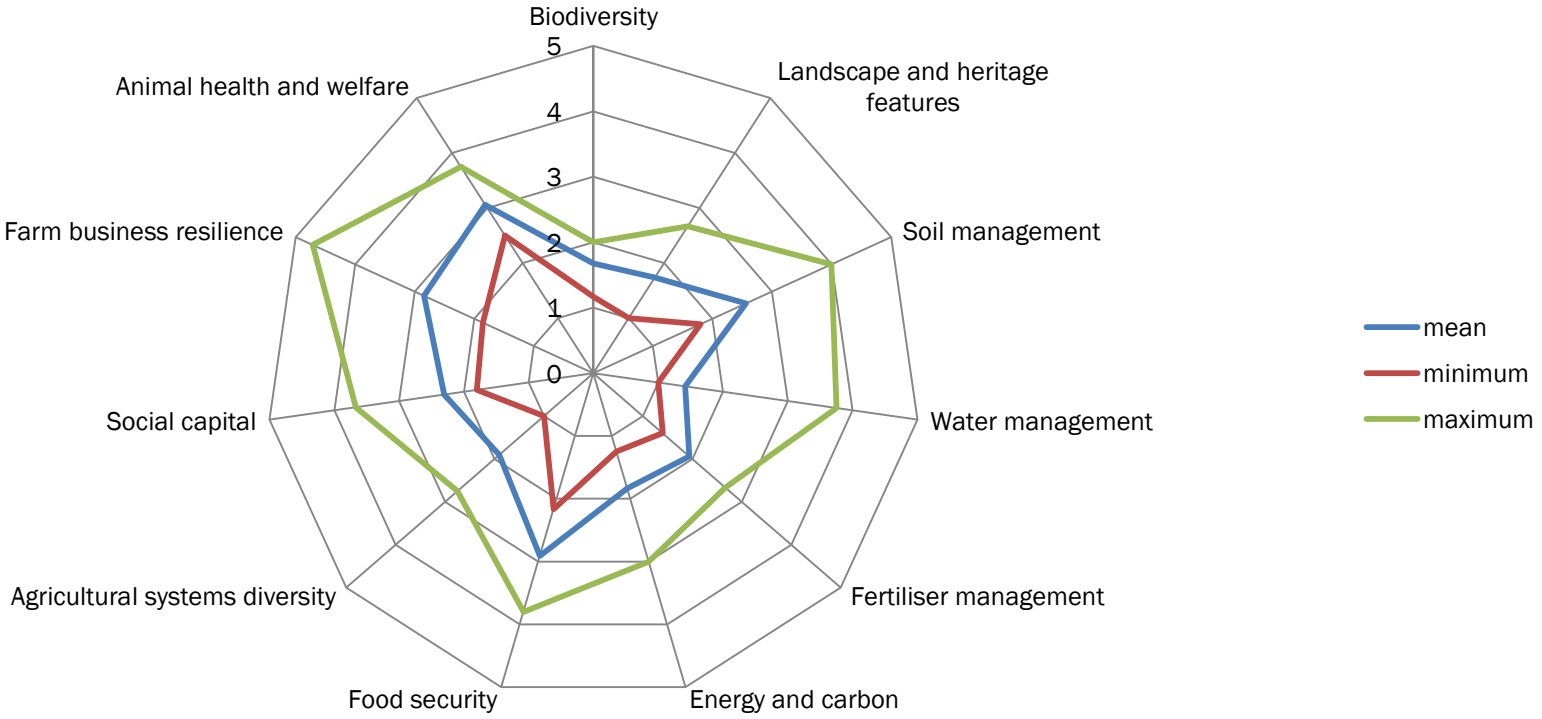
2,000 parasitological examinations (from individual goats) have been performed including coprocultures for the identification of nematode genera.

Data regarding the fertility status as well as assessments of welfare for individual goats of the participating flocks (900 goats).

Genotype information about, **a_{s1} casein, β-lactoglobulin, κ-kasein from 750 goats**

Assessed Parameter	Mean
Animals/flock and management	
Adult goats	364
Bucks	26
Yearlings	74
Annual replacement rate	0.13
Prolificacy (kids per goat)	1.50
Milking goats	317
Machine milking installed in farms	0.31
Number of milkings per day	2.07
Milk yield/goat (lt)	207
Age of kids at weaning age (days)	82
Age of yearlings at mating (months)	9.2
Goats body weight (kg)	48
Bucks body weight (kg)	68
Kids carcass weight (kg)	9.6
Milk price (€/lt)	0.58
Meat price (kids) (€/kg)	5.40
Meat price (adult animals) (€/kg)	2.50
Land use/farm (hectares)	
Cultivated land	28
Cultivated land per livestock unit	0.37
Irrigated land	2.46
Non-irrigated land	25
Cultivated land for grazing	11.7
Duration of grazing (hours)	
Spring	8.2
Summer	10.7
Autumn	8.6
Winter	4.5
Walking distance for grazing (km)	
Spring	7.3
Summer	9.3
Autumn	7.1
Winter	4.0
Feedstuffs per farm/year (tones)	
Roughages	37
Concentrates	78
Straw	7
Personnel	
Number of workers	1
Number of family members	1.3
Total labour units	2.9
Livestock units per worker	22

Sustainability assessment of goat farms in Greece



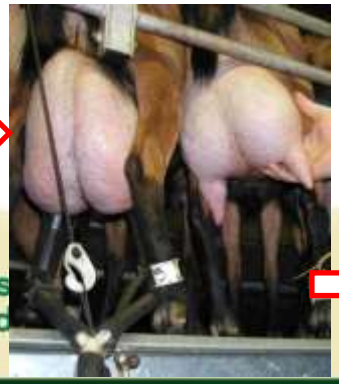
One Case study:

Amalthia farm

http://www.agroamalthia.gr/

Vertical organization

direct implementation of research data



What's next?

The Happy goat app

https://youtu.be/uH2JJiVxs7k

Future trends

- Animal health must be preventative in order to give excellent returns on investment
- Transparency in disease reporting and sharing of accurate information between countries is necessary
- Wide implementation of ground breaking technologies
- DNA markers for economic traits (e.g. OvineSNP50, CaprineSNP50 genotyping beadchip)
  - disease susceptibility
  - Milk production
  - Reproduction
  - Growth

Future trends in livestock production in Greece

- **Policy makers and stakeholders must focus on sheep and goats**
- **Calves from dairy herds should be used in feedlots**
- **Demand for Milk production will increase**
- **Economic pressures will dictate production systems:**
  - Semi-Intensive and intensive systems will prevail
  - Number of farm holdings will decrease
  - There will be major changes in housing and nutrition
  - Machine milking will be the norm
  - Smallholder flocks will disappear

The way forward

We propose the formation of two major clusters

Cluster 1 – MILK

Cluster 2 - MEAT

Requirements:

- Effective cooperation of academia and industry
- Effective communication between stakeholders
- knowledge exchange and better training of farmers to increase efficiency and effectiveness of their farms

The way forward

- **Understanding the changes** in milk and meat production and their implications for health, welfare and product safety
- **Ability to address the complexity of production systems**
  - socioeconomics
  - Sustainability
  - globalisation
  - Climate change and its impact on the epidemiology of diseases
- **Investment in innovation**

Thank you for your attention