

### The iSAGE decision support system (DSS)

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Innovation for Sustainable Sheep and Goat Production in Europe



### European sheep & goat sector





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# Shortage of decision support tools





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#### WP4 – Task 4.4

Produce user friendly tools that can be provided to industry

**Objective:** Develop a *decision support tool* that will optimise sheep and goat production and will incorporate the recommended changes









Model-driven, web-based, decision support system for sustainable small ruminant farming

#### Features

- Future what-if scenarios
- Different production systems
- Important farm aspects
- Simple and comprehensible reports focused on:
  - ✓ Profitability
  - ✓ Productivity
- Human readable advice
- Create/compare different scenarios

#### **Impacts & Benefits**

- Visualization of impact of choices
- Action plan on *efficient farm management*
- Production and profitability optimisation



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# Production and farming systems

- Meat sheep production system
  - Intensive
  - Extensive
- Dairy sheep and goat production systems
  - Intensive
  - Extensive





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### **Potential users**

- Sheep and goat farmers
- Consultants
  - ✓ Veterinarians
  - ✓ Animal scientists
  - ✓ Co-operatives
- Companies
  - ✓ Dairies
  - ✓ Machinery construction companies
  - ✓ Feed companies







### Input parameters

- Flock size
- Production (*targeted meat or milk, animal weight*)
- Grazing (yes / no, area grazed, grazing time & distance, pasture availability)
- Feeding (*amounts & nutritional values of feeds*)
- Income from subsidies
- Costs (detailed breakdown of variable costs)
- Farm prices (*products & feeds*)







#### **Data collection – Defaults values & acceptable ranges**

- Meat sheep production system
  - ✓ UK
    - $\circ$  Agriculture and Horticulture Development Board (AHDB)
    - $\circ$  National Sheep Association (NSA)
  - ✓ Spain Oviaragón Pastores Grupo Cooperativo
- Dairy sheep production system
  - ✓ **France** Institut de l' elevage (idele)
  - ✓ **Greece** Laboratory of Animal Husbandry, AUTH
- Dairy goat production system
  - ✓ **Greece** Laboratory of Animal Husbandry, AUTH













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### **Projectional model**





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### **Estimates - Outputs**

- Simulations of scenarios Reports on profitability & productivity
- Farm income, variable costs and gross margin
- Production estimates

Meat sheep farms Live weight Carcass weight Dairy sheep & goat farms Live weight Milk production

- Pasture availability at the end of the year
- Useful farm statistics (e.g. ram to ewe ratio, stocking rate)
- Other advanced outputs



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### **Estimates – Advanced outputs**

- Potential intake of animals
- Pasture intake
- Total feed intake
- Metabolisable energy (ME) & protein (MP) requirements
- ME, DUP, ERDP, MCP & MP intake
- Energy and protein balance
- Outputs based on energy and protein balance





### **Cloud-based app**

- Input of data to designated web forms
- Check for correctness
- Comparison with theoretical min and max limits
- Central collection and storage on a cloud server
- Processing with a model algorithm
- Guide for farm management decisions





# How does it work?



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### 1<sup>st</sup> Step: Login

isag	EDSS	Login
	User Login   Username   username   password     Sign in	



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# 2<sup>nd</sup> Step: My farms

is a second	5AG	EDSS				farms	, w	/elcome svouraki	v
My farms:									
IAME	ТҮРЕ	LOCATION	ANIMALS	EWES	GROSS MARGIN /ANIMAL	GROSS MARGIN	INCOME	COSTS	
UK meat sheep farm	Sheep	Yorkshire, United Kingdom	1100	500	40 €	20000€	70000 €	50000€	view
Spanish meat sheep farm	Sheep	Monnels	2000	800	60 €	50000€	110000€	<mark>60000 €</mark>	view
French dairy sheep farm	Sheep	Bordeaux, France	500	370	97€	120000€	200000€	80000€	view
Greek dairy goat farm	Goat	Xrisopetra, Kilkis	265	200	70€	14000€	46000 €	32000€	view
	Sheep	Vasilika, Thessaloniki	265	200	100€	20000€	60000€	40000 €	view



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### 3<sup>rd</sup> Step: Create farm

is A	GEDSS	farms Welcome svouraki ~
	IDENTITY INFO	BASE DATA
	Farm Indentity information Please insert the identifying data for the farm. Model Type	
	Farm name	Farmer full name
	Address	Telephone
	email placeholder	
	Geographical Location (Google Maps)	
AGE	Description	

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90

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## 3<sup>rd</sup> Step: Create farm

isag	EDSS	farms Welcome svouraki ~	
	IDENTITY INFO	BASE DATA	
	Basic farm data Please insert the data for size and output of the farm acc used in order to facilitate the comparison with the results	ording to the previous year's production. These basic information is of the projectional scenarios that you will be creating.	
	Total number of sheep	Number of ewes animals	
	Profit €/ye	Profit per ewe ear €/year	
	Income €/ye	Costs ear €/year	
	Save farm CANCEL		

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### 4<sup>th</sup> Step: My farm

is	AGEDS		farms Welcome svouraki 🗸		
		UK meat	sheep farm		
Animal	type	Pr	oduces MEAT	с	ountry Model
SHE	P				
SHEE Cenarios Average meat she his scenario describes the m 00 replacement lambs.	e <b>p farm manag</b>	ement (default val	ues) (shire, United Kingdom. The flo	ock consists of 500 ewes, 10	+ Create Scenario Edit Scenario   View Report rams, 500 finishing lambs and
Cenarios Average meat she his scenario describes the m 00 replacement lambs.	ep farm manag anagement of an average k	ement (default val owland meat sheep farm in York GROSS MARGIN PER EWE	ues) (shire, United Kingdom. The flo GROSS_MARGIN €	ock consists of 500 ewes, 10 INCOME €	+ Create Scenario Edit Scenario   View Report rams, 500 finishing lambs and COSTS €



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This is a lowland meat sheep farm in Yorkshire, United Kingdom with 500 ewes

		UK meat sheep farm
Save Scenario	CANCEL	
Index	Scenario name	
1. Flock characteristics		
2. Production		
3. Grazing		
4. Feeds	Scenario description	
0. Concentrate fed per day		
1. Straw fed per day		11
2. Hay fed per day		
3. Silage fed per day		
4. Dry matter of feeds		
5. Metabolisable energy in feeds	Fill form with default values	
<ol><li>Digestible undegrated true protein in feeds</li></ol>		
<ol><li>Effective rumen degradable protein in feeds</li></ol>	s 1 Electroparenteristics	(Show help)
5. Income and costs	I. FIOCK Characteristics	
0. Subsidy	How many animals do you have and sell?	
1. Cost of labour		
2. Cost of seasonal labour	Number of lambs reared for breeding (replacement	nt) Number of lambs bought for breeding (replacement)
3. Area rented	100 animal	is 0 animals
4. Cost of renting		
5. Transport	Number of lambs reared for finishing	Number of lambs bought for finishing
6. Utility bills	500 animal	e o asimale
7. Veterinary costs	300	S 0 eminials
8. Grazing land costs	Number of awar	Number of barran awar
6. Prices	Number of ewes	Number of Darren ewes
	500 animal	s 25 animals



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1. Flock characteristics	(Show help)
How many animals do you have and sell?	
Number of lambs reared for breeding (replacement	ent) Number of lambs bought for breeding (replacement)
100 anima	animals
Number of lambs reared for finishing	Number of lambs bought for finishing
500 anima	ls 0 animals
Number of ewes	Number of barren ewes
500 anima	animals
Number of rams	Number of adult sheep slaughtered
10 anima	animals
Number of lambs sold for breeding	Number of lambs sold for finishing
0 anima	ls 120 animals



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2. Production	(Show help)
How much do your animals produce?	
Average ewe weight	Average milk production
70	kg 1.35 kg/day
Fat in milk	Protein in milk
9	% 4.9 %
Duration of lactation period / age at weaning	Birth weight
4 mo	ths 4 kg
Weight at weaning	Age at first mating
32	kg 8 months
Lamb carcass weight sold	Dressing percentage
20	kg 47 %
Lamb age at slaughter	Wool production
8 mo	ths 3 kg/year



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3. Grazing	(Show help)
Which of your animals graze pasture at any t	time of the year and how much pasture is there?
Replacement lambs	Finishing lambs
Ewes during lactation period	Ewes during dry period excluding last month before birth
Ewes during last month before birth	Barren ewes
Rams	Area grazed hectare
Grazing time	Grazing distance
7 hours/day	y 0 km/day
Annual pasture available	
8500 kgDM/hectar	e



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hat and how much do you feed your animals?		
<ul> <li>4.0 Concentrate fed per day</li> </ul>	8	(Show help)
How much concentrate do you feed to each o	of your animals daily?	
Concentrate fed to replacement lambs per day	Concentrate fed to finis	hing lambs per day
0.02 kg/animal/day	0.01	kg/animal/day
Concentrate fed to ewes per day during lactation period	Concentrate fed to ewe period excluding last m	s per day during dry onth before birth
0.1 kg/animal/day	0	kg/animal/day
Concentrate fed to ewes per day during last	Concentrate fed to barr	en ewes per day
0.6 kg/animal/day	0	kg/animal/day
Concentrate fed to rams per day		
0 kg/animal/day		



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o. Prices	
Prices for products and feeds	
Lamb meat price	Adult meat price
4 €/kg carcas	ss 2 €/kg carcass
Lambs sold for breeding price	Lambs sold for finishing price
100 €/anim	al 90 €/animal
Adult sheep sold price	Wool price
⊴80 €/anim	al 0.65 €/kg
Concentrate for replacement lambs price	Concentrate for finishing lambs price
0.27 €//	g 0.27 €/kg
Concentrate for lactation period price	Concentrate for dry period/barren ewes price
0.28 €/k	g 0.24 €/kg
Concentrate for last month before birth price	Concentrate for rams price
0.27 €//	g 0.25 €/kg
Straw price	Hay price
0.07 €//	g 0.075 €/kg
Silage price	Fluctuating number animals (internal use only)
0.1 €//	g 1 number



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### 6<sup>th</sup> Step: Report page

otal number of heep	1.135 ANIMAL	ted weight of finishing considering	<b>3,562</b> кс	Estimated carcass weight change of finishing lambs	1,674 Edit scenario
Quick navigation : Product	tion Profit Financial I	Projections D	etailed data		
Scenario res	ults				Gross margin
Lambs	Energy Balance	Protei	n Balance	Weight Change	Gross margin
Replacement lambs	-0,27 MJ	44,13	g	-1,64 kg	<b>20.044,27</b> €/year
Finishing lambs	1,34 MJ	39,12	g	3,56 kg	Gross margin per ewe
Estimated carcass weig kg	ght <mark>change of finishing</mark>	lambs consid	dering energy and	protein balance: 1,67	<b>39,32</b> €/year
Adult animals	Ener	gy Balance	Protein Balance	Weight Change	Gross margin excluding subsidies
Ewes during lactation period	od -2,80	) MJ	24,59 g	-8,39 kg	<b>7.044,∠7</b> €/year
Ewes during dry period	6,68	MJ	87,37 g	10,50 kg	Gross margin per ewe excluding subsidies
Ewes during last month be	fore birth 1,81	MJ	44,58 g	0,97 kg	<b>14,56</b> €/year
Barren ewes	7,14	MJ	89,67 g	10,50 kg	



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# 6<sup>th</sup> Step: Report page

Income		Costs		Costs per animal	
74581.07 €/year		53936.8 €/year			
				58.5	
				40.0	
				20.0	
Income from meat	49.786,57 €/year	Feed costs	10.111,80 €/year	0.0	
Income from live animal sales	10.800 €/year	Seasonal labour cost	900 €/year	ween"	all all a second and a second as a second
Income from subsidies	13.000 €/year	Total costs of labour	29.700 €/year	Feed costs per replacement lamb	0,65 €/animal
Income from wool sales	994,50 €/year	Cost of renting	0 €/year	Feed costs per finishing lamb	0,32 €/animal
Income	74.581,7 €/year	Farm running costs	1.500 €/year	Feed costs per ewe	19,77 €/animal
		Farm utility costs	4.390 €/year	Feed costs per barren ewe	0 €/animal
		Veterinary costs	7.335 €/year	Feed costs per ram	0 €/anima
		Grazing land costs	0 €/year	Variable costs per replacement lamb	38,80 €/anima/
		Costs	53.936,80 €/year	Variable costs per finishing lamb	38,47 €/anima
				Variable costs per ewe	58,92 €/anima
				Variable costs per barren ewe	39,15 €/anima
				Variable costs per ram	38,15 €/animal



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### **Basic simulated scenarios**

- Flock size optimisation
- Production optimisation
- Pricing: Lower meat/milk prices & higher feed prices
- Extensification of the production system
- Different feeding strategies







### Next steps

- Testing and feedback from sector/industry
- Improvements on the system
- Obtain defaults and ranges from other countries to create customised models





# Thank you!



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