iSAGE model farm and challenging scenarios

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Objective



 What is the scope of new strategies for making sheep and goats more sustainable, environmentally friendly and resilient (e.g. to climate change). {POLICY RELEVANCE}



The tool to analyse farm scenarios:





Simulates the effect of management x genetics x soil x climate on

> Farm environmental performance (losses of N and C {and sinks of soil SOC}) Basic economics Other atributes of sustainability

Boundaries: Farm, includes pre-farm gate emissions Generic submodels Semi process-based Written in DELPHI (PASCAL-based programming) language) Main use: strategic run what-if scenarios (current,





An example of impacts at farm level (dairy sheep)



Modelled with SIMS_{SR} (Del Prado et al. 2019)



Innovation for Sustainable Sheep and Goat Production in Europe Dairy sheep system in Greece (Chios breed) Reproductive system: 1 lambing per year 300 ewes intensive

FEED

- No grazing
- Alfalfa hay from irrigated land (homegrown/bought)
- Cereals (homegrown wheat)
- Wheat straw (homegrown wheat)
- Concentrates





Examples at farm level (dairy sheep)



- No effect for 2021-2050
- over 20% more feed per L produced after year 2050 is required





Summary of impacts on feed-related issues

For extensive/semi-extensive systems

- reductions in available pasture for grazing, forage and cereal production (specially from rainfed systems)
- more dependent on external feed (assuming that no extra, possible even fewer land will be spared for small ruminant productions)
- Will public services be paid for? (market or subsidies)

For intensive systems

 feed prices (product prices too) will affect most the viability of the farms.







What is the role of small ruminants for reducing the effect of agricultural sector on climate change?

- Paris Agreement: Plans to become carbon neutral need to be specified in INDCs and inform global progress towards -2ºC target
- Reducing GHG emissions. Agriculture, Small ruminants?





GHG (direct) from goats in the Mediterranean basin (example)



Based on FAOstat and IPCC (2019). Spain, Gibraltar, France, Monaco, Italy, Malta, Slovenia, Croatia, Bosnia and Herzegovina, Montenegro, Albania, Greece, Turkey, Syrian Arab Republic, Cyprus, Lebanon, Israel, Palestine Egypt, Libya, Tunisia, Algeria, Morocco

Using https://www.ipcc-nggip.iges.or.jp/public/2019rf/index.html

<u>lower</u> GHG emissions estimates compared with the estimate using the currently widely used IPCC (2006)



Reducing grazing in marginal land (for extensive systems), good for the environment?

Do emissions drop by reducing sheep grazing in marginal land?





Reducing grazing in marginal land (for extensive systems), good for the environment?

Reducing grazing requires a shift from using marginal land (not suitable for other agricultural purposes except forest) to using more arable land (land suitable to grow crops that can be directly consumed by humans)





Improving feed sources and use of alternative feed sources for both intensive and extensive systems







More adapted/resilient animal breeds and grass/pasture breed (an example)



Innovations-an example allele ROA (prolificacy)



Thanks

Merci



And the second

