# (COS)

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# Climate change mitigation strategies for the small ruminant sector: Insights from the SheepToShip LIFE project





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#### Looking for an eco-sustainable sheep supply chain: environmental benefits and implications





# The project at a glance

Project location: Sardinia, IT

**Budget:** 2.610.043 € (EC Co-funding: 60 %)

Duration: <u>5 years</u>, from 01/07/2016 to 30/06/2021





# SheepToShip LIFE: mitigating GHG emissions improving efficiency



<u>Evaluation of</u> <u>environmental</u> <u>impacts</u> farms and dairy plants



Definition of <u>best</u> <u>practices</u> FT KNOW HOW

Case study farms:

application of

best practices



<u>Environmental Action</u> <u>Plan (</u>-20% CO<sub>2</sub> in 10 years)







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# Facts & Numbers

#### **Relevance of the Sardinian sheep sector**

- $\square$  3 M heads ( $\approx$  5% of the EU sheep population)
- $\Box \approx 10.000$  active sheep farms and 50 dairy factories
- $\Box$  0,32 Mt/year milk:  $\approx$  13% & 70% of  $\bigcirc$  and



□ High quality pecorino cheeses: 58% PDO









## Facts & Numbers

#### Distribution of sheep farms – semi-extensive









# Facts & Numbers

#### **Relevance of the Sardinian sheep sector**



Annual GHG fluxes from the sheep milk sector

Sardinia  $\approx$  1,6 Mt CO<sub>2</sub>-eq EU  $\approx$  12 Mt CO<sub>2</sub>-eq







# Methodological approach

#### An effective eco-innovation plan







# Environmental profile of dairy sheep farming

#### **Emission intensity & milk production level**



- 2016-2017 data
- □ 30 dairy sheep farms
- ISO standard 14040-44 (2006)
  FAO LEAP (2016)
  EC PEFCR (2018)
- □ from cradle to gate
- functional units:
  - 1 kg FPCM
  - 1 ha UAA







## Environmental profile of dairy sheep farming

#### Emission intensity, MPL & functional unit

Functional unit	Milk production level		
	Low	High	
	< 130 kg of FPCM / ewe per year	> 130 kg of FPCM / ewe per year	
kg CO $_2$ eq / kg FPCM	3,75 <sub>(0,18)</sub>	5,57 <sub>(0,19)</sub>	
kg CO $_2$ eq / ha UAA	<b>3819</b> (316)	3743 (441)	







# Mitigation techniques & demonstration actions

#### **Based on hotspots**









# Mitigation techniques & demonstration actions

#### **Based on hotspots**

Groups of mitigation techniques	Emission intensity kg CO <sub>2</sub> eq / kg FPCM	Gross margin (% variation)
Animal management (innovative reproduction and management protocols)	-3 ÷ -27%	+1 ÷ +120%
Animal feed production and reduction in purchased concentrates (increase in on-farm legume forage, early-cut hay, and haylage)	-2 ÷ -9%	+1 ÷ +28%
Feed crop cultivation management (low-input agricultural practices, use of self-reseeding legume-grass mixtures)	-3 ÷ -7%	+1 ÷ +8%
<b>Energy consumption</b> (reducing crop cultivation operation, use of renewable energy)	-0,5 ÷ -5%	+1 ÷ +2%





## Mitigation techniques & demonstration actions

#### **Reduction in GHG & methane emissions**









# Integration of LCA & System Dynamics

#### **Causal Loop Diagram: Regional Flock & Milk Production**









# Integration of LCA & System Dynamics The Big Picture









#### □ A 20% reduction of GHG emissions in 10 years is realistic

#### □ Key saving mechanisms:

- > Improvement of animal management (GHG & CH4)
- Changes in feed supply strategy (GHG & CH4)
- > Changes in feed crop cultivation techniques (GHG & CH4)
- Reduction of energy consumption (GHG)

□ An effective mitigation plan at territorial level should be based on

- > Dairy flock efficiency where milk production potential is higher
- Enhancement of ecosystem services where the potential for nonmarketable goods is higher
- > Payments based on eco-innovation design and environmental indicators
- □ A strategy involving European, national and local policies
- Carbon market & Carbon sequestration











- The LIFE website and the new LIFE programming period 2021-2027 https://cinea.ec.europa.eu/life\_en
- The new LIFE call for proposals 2022 https://cinea.ec.europa.eu/life/life-calls-proposals\_en
- Access to the LIFE project database
  https://webgate.ec.europa.eu/life/publicWebsite/search
- The new LIFEis30 website <a href="https://www.lifeis30.eu/">https://www.lifeis30.eu/</a>
- Get in touch with your National Contact Points
  <a href="https://cinea.ec.europa.eu/programmes/life/about-life/life-contacts/european-national-contact-points\_en">https://cinea.ec.europa.eu/programmes/life/about-life/life-contacts/european-national-contact-points\_en</a>



# Thank You!!!

<u>Contact us here: cinea-life-</u> <u>enquiries@ec.europa.eu</u>





30 years of bringing green ideas to LIFE





# That's all ... Thank you!!!



