Testing mitigation actions to reduce GHG emissions from sheep farming in Europe

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Review of existing mitigation practices

- **194** mitigation strategies screened and evaluated from previous projects
  - 69 for dairy farms, 81 for meat farms, 44 for both

- Classification of theses practices into 8 detailed topics
  - 2 main ones : sheep flock & surfaces management

| Animal feeding and nutrition	Animal health and welfare	Animal management	Animal reproduction
Animal genetics and breeding	Manure & fertilizers management	Surfaces management	Energy production and consumption

- Very few quantifications of the impact of mitigation practices in sheep farming !
  - →Need of implementing and testing mitigation practices and assessing their GHG, environmental & economic impacts

Monitoring of a large EU-scale sample of 282 innovative sheep farms
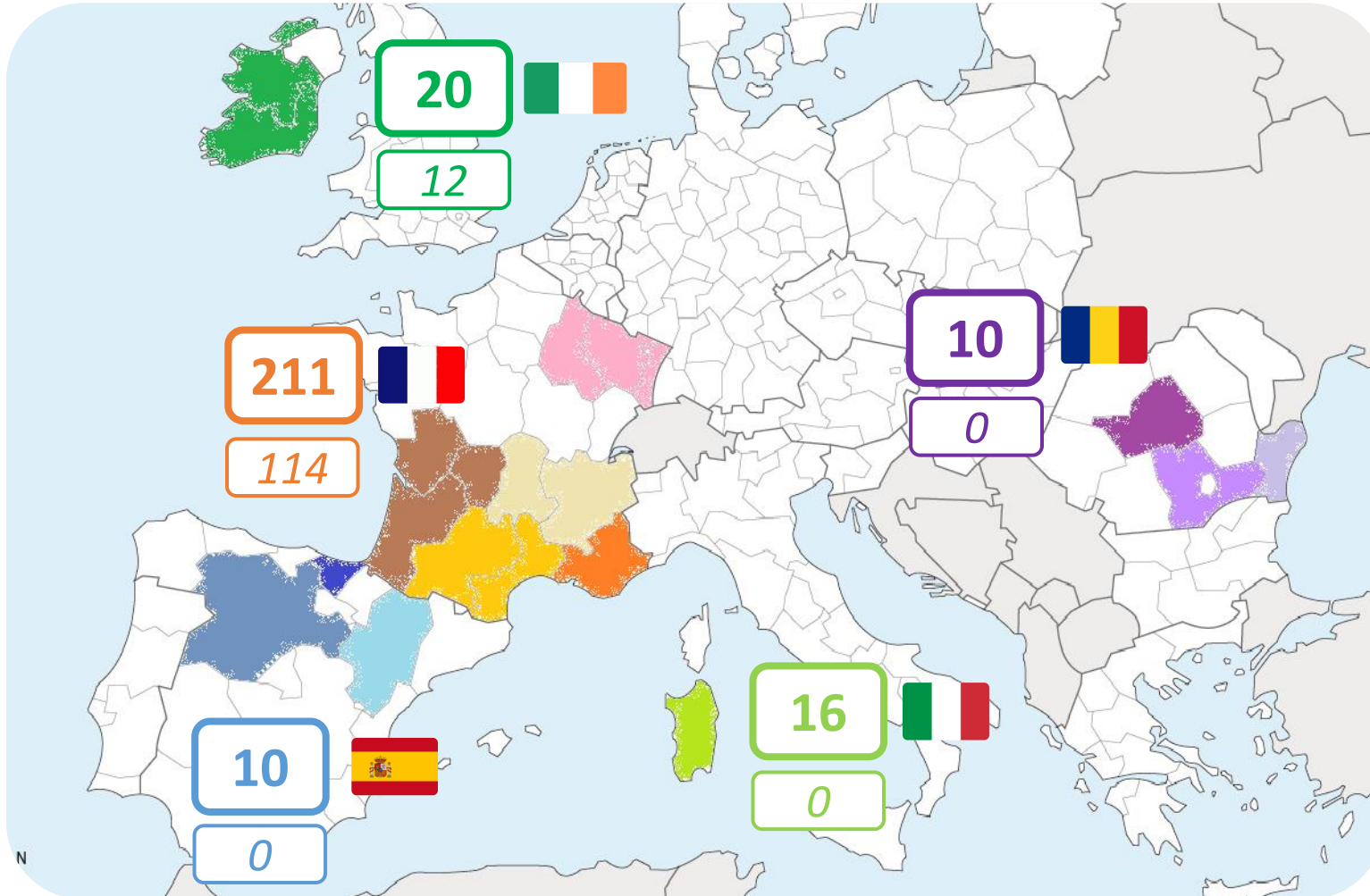
Since assessments and carbon action plans are still on-going, following results are based on a sample of **126** farms *(identified in italics)*

Implementation of mitigation practices and monitoring

- ## Initial assessment
  - Of CF and also other environmental impacts and sustainability indicators

- ## Carbon action plan
  - A combination of one or several mitigation practices identified
  - Assessment of the impacts (technical, environmental, economic...) of these practices

- ## Implementation of mitigation practices
  - Monitoring during 3 years

- ## Final assessment at the end of the project
  - Objective : an average GHG mitigation of -12%

Initial assessment

Actions plan

Implementation of practices

Final assessment

For Irish farms, mainly mitigation practices based on overall surface management *(12 carbon action plans)*
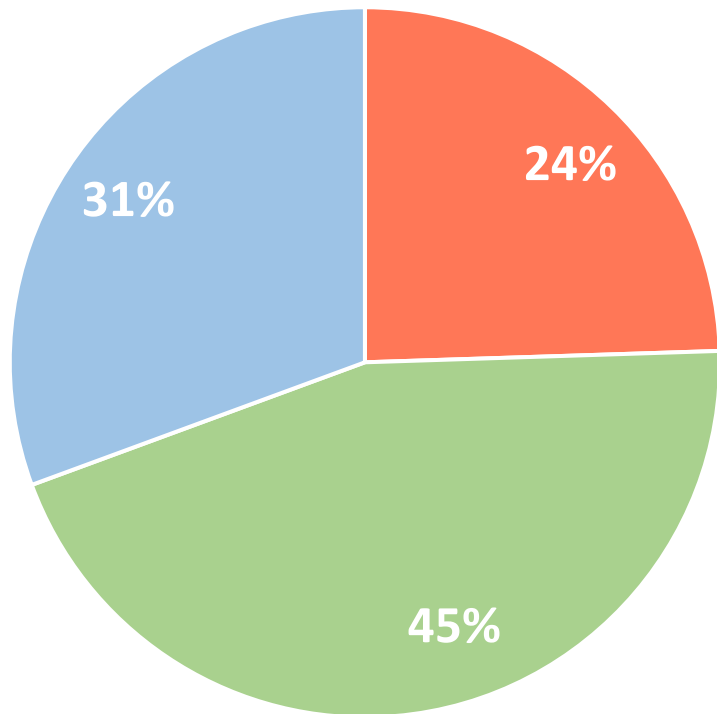
FLOCK MANAGEMENT

- Use of Eurostar Ram on Lowland Flock (10%)
- Lambs weaned per ewe per Year (6%)
- Pregnancy rate of ewes and hoggets to ram (6%)
- % of first time lambers as hoggets (6%)
- Animal Health (3%)

FERTILIZATION

- **Soil Nutrient Management for Improved N Efficiency (8%)**
- Use of Low Emission Slurry Spreading (LESS) for Slurry application (6%)
- Lime Status - Mineral Soils (4%)
- Use of Protected Urea (2%)
- P Index on High Output Pasture (2%)
- Slurry Spread timing (2%)

SURFACE MANAGEMENT

- **Managing the farm for grazing season length (16%)**
- **Grazing management (14%)**
- Improving hedgerow management for carbon (and Biodiversity) (6%)
- Forestry - Commercial Conifer (5%)
- Proportion of Clover in Sward (2%)
- Planting hedges on the farm (2%)

Pie chart: 31%, 24%, 45%

(%) means the number of times this practice has been identified / number of practices identified

74th

For French meat farms, mainly mitigation practices based on herd and surface management *(61 carbon action plans)*

ENERGY AND MANURE MANAGEMENT
- Reduce fuel consumption (3%)
- Reduce electricity consumption (3%)
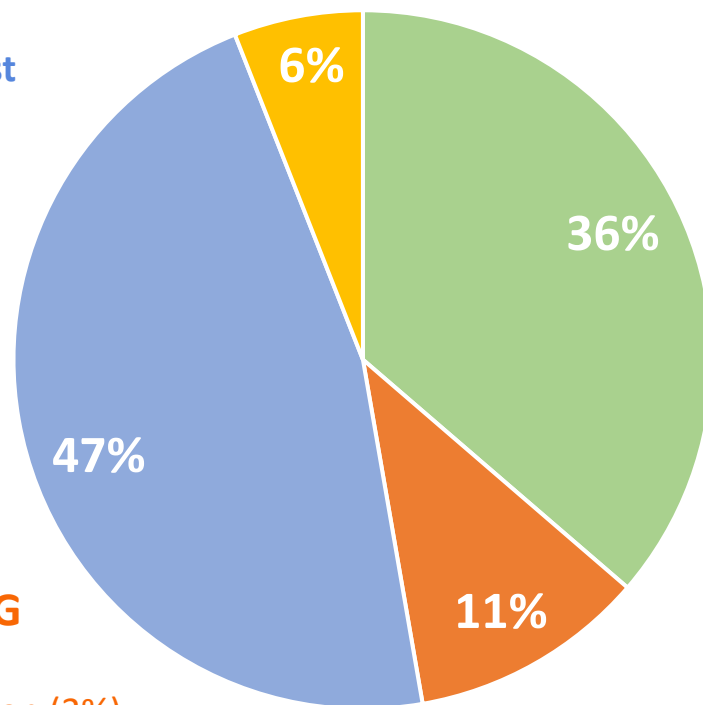
FLOCK MANAGEMENT
- Improve sanitary management to boost productivity (19%)
- Improve fertility (13%)
- Improve overall herd management and reduce the number of unproductive animals (7%)
- Increase the finishing rate (6%)
- Decline in lamb mortality (1%)
- Increase in the sheep flock (1%)

SURFACE MANAGEMENT
- Evolution of the "crops/temporary grassland" rotation (8%)
- Optimize fertilization N,P,K (8%)
- Planting hedges on the farm (6%)
- Planting legumes as a mixture or pure crop (6%)
- Planting intermediate crops (3%)
- Switch to direct seeding (3%)
- Development of intra-plot agroforestry in cultivated plots (1%)
- Conversion of crop rotation to permanent grassland (1%)

FLOCK FEEDING
- Increase grazing time (5%)
- Optimize concentrate consumption (3%)
- Increase protein autonomy (2%)
- Improve forage quality (1%)

Pie chart values: 6%, 36%, 11%, 47%
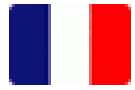
(%) means the number of times this practice has been identified / number of practices identified

For French dairy farms, mainly mitigation practices based on surface management & herd feeding *(53 carbon action plans)*
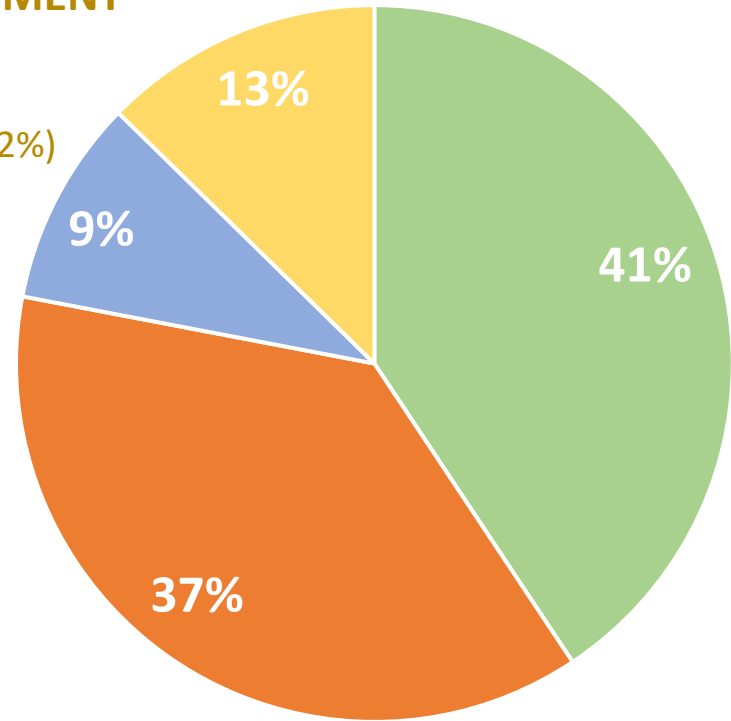
ENERGY AND MANURE MANAGEMENT

- Reduce electricity consumption (4%)
- Reduce fuel consumption (3%)
- Improving manure spreading methods (2%)
- Methanization of animal manure (2%)
- Composting manure (1%)
- Effluent storage tank cover (1%)

FLOCK MANAGEMENT

- Improve sanitary management to boost productivity (3%)
- Improve fertility (3%)
- Improve overall herd management and reduce the number of unproductive animals (3%)

SURFACE MANAGEMENT

- **Planting legumes as a mixture or pure crop (10%)**
- **Optimize fertilization N,P,K (8%)**
- Evolution of the "crops/temporary grassland" rotation (7%)
- Switch to direct seeding (6%)
- Planting intermediate crops (4%)
- Planting hedges on the farm (4%)
- Development of intra-plot agroforestry in cultivated plots ha (1%)
- Conversion of crop rotation to permanent grassland (1%)

41%
37%
9%
13%

FLOCK FEEDING

- **Optimize concentrate consumption (21%)**
- Increase grazing time (9%)
- Improve forage quality (5%)
- Increase protein autonomy (2%)

(%) means the number of times this practice has been identified / number of practices identified

Do the main topics of mitigation practices differ according to the type of system?

- For meat sheep farms :
  - The same mitigation practices topics emerge for most of the rearing systems : surfaces management & Flock management

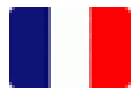- Except for intensive systems : Energy & manure management

- For dairy sheep farms :
  - The same mitigation practices topics emerge for each rearing system : surface management & flock feeding

- Then, energy and manure management & flock management

→ Different mitigation practices according to the country / sector / rearing sheep system

For French meat farms, an average GHG mitigation of 13,3%

	Intensive (3 farms)	Semi intensive (39 farms)	Semi extensive (14 farms)	Extensive (5 farms)	National average (61 farms)
GHG emissions mitigation	-4,0%	-13,1%	-15,2%	-15,2%	-13,3%
Carbon gains (t CO2/year)	32	182	148	112	157
Carcass production trend	+ 3,2 %	+ 1,9 %	+ 5,3 %	+ 18,0 %	+ 3,1 %
Partial budget/ewe	+ 7€	+ 21€	+ 7€	+ 11€	+ 19€

- 12% reduction target achieved but depending on the rearing systems

- With not always a increasing of the production

- With economic gains

For French dairy farms, an average GHG mitigation of 9,2%

	Semi intensive (22 farms)	Semi extensive (16 farms)	Extensive (15 farms)	National average (53 farms)
GHG emissions mitigation	- 7,6%	- 9,8%	- 9,2%	-9,2%
Carbon gains (t CO2/year)	77	69	38	61
Milk production trend	+ 4,3 %	- 2,8 %	+ 2,7 %	- 2,1 %
Partial budget/ewe	+ 15 €	+ 29€	+ 24€	+ 21€

- 12% reduction target not reached yet

- With not always a increasing of the production

- With economic gains

Conclusion

- **Main topics of mitigation practices**
  - Surfaces management and flock management for meat sheep farms
  - Surfaces management and flock feeding for dairy sheep farms

- **Mitigation practices are different according to the country / sector / rearing system**
  - Need to adapt the practices / no single way to reduce emissions

- **A mitigation of 12% of GHG in sheep farming is possible !**
  - With a higher technical efficiency, and a higher competitiveness
  - With economic gains !

- **This work is still in progress and these are preliminary results**
  - Final results with sustainability aspects by the end of this year
  - Considering also carbon storage

Thank you for your attention and thanks to all partners for these preliminary results

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