LIFE Green Sheep: finding common methods to estimate environmental impact from sheep farms

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The LIFE GREENSHEEP project

EU LIFE 2014-2020, call 2019 - Subprogram of Climate Change Mitigation (CCM).

Objective: to reduce the carbon footprint of sheep meat and milk production by 12% in France, Ireland, Italy, Romania and Spain.

Specifically to:
° **Carry out a large-scale diagnosis of GHG emissions** and carbon storage in sheep farms using common methods;
• **Demonstrate and disseminate climate-friendly sheep farming practices;**
• **Assess the sustainability** of targeted farms with effective action levers of climate change adaptation;
• **Develop a common approach for sheep meat and milk.**

Expected results:
- Decrease in GHG emissions of 30,621 tons CO2eq.,
- A common methodology for the assessment of the farm carbon footprint and sustainability;
- GHG emissions and sustainability assessment for 1355 demonstration and 282 innovative farms using developed common tools.
- Evaluation of several innovative mitigation practices applied in sheep farms;
- Economic and social feasibility analysis for the implementation of a carbon plan;
- 22 GreenSheep mitigation action plans in France, Ireland, Italy, Romania and Spain;
- European network of 143 advisers and 1'637 farmers.

Coordinating Beneficiary: Institut de l'Elevage, Paris.
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MAIN RESULTS

CAP'2ER/DEO and ArdiCarbon: many impact categories, economic and social impacts. Carbon sequestration from soils.

Carbonsheep: only carbonfootprint with data spatialization.

Carbon Navigator not LCA, uses territorial databases and simulates cutting emissions plans with policy focus.

A common method Greensheep LIFE will integrate the current approaches in a powerful tool for farms advisors and policy makers applicable at European level (Table 1).

Difficulties in the common method development:
to define an exhaustive input framework to ensure accurate data collection in different production system across Europe (Intensive vs. extensive; milk and meat; breeds, seasonality, etc).

Quantiative evaluations will be carried out with tests in France, Spain, Ireland, Romania, Italy.

AIM

To disseminate activities of the LIFE GreenSheep (LIFE19 CCM/FR/001245) targeting a common Carbon footprint assessment methodology in Europe based on tools developed in France (CAP'2ER/DEO), Ireland (Carbon Navigator), Spain (ArdiCarbon), Italy (Carbonsheep).

METHODS

A qualitative comparison was firstly assessed. These tools were inspired by IPCC (2006; 2019) for animal and farm emissions. Modified algorithms and locally developed equations were adopted in each tool to better fit production systems within country (Table 1).

TABLE 1. GHG tool comparison

Item	CAP'2ER/DEO	ARDICARBON	CARBON NAVIGATOR	CARBONSHEEP	Common Method (LIFE Green Sheep)
Country/ Developer	France/INSTITUTE DE L'ELEVAGE	Spain/NEIKER	Ireland/ TEAGASC	ITALY/University of Sassari	EUROPE/GREENSHEEP CONSORTIUM
Species	Sheep, Goat, Dairy and Beef cattle	Sheep	Sheep - Cattle	Sheep - Goats	Sheep
Approach	LCA and mitigation plan		Simulator of mitigation plans	LCA	Simplified LCA
Levels of complexity	Lev.1: impact calculation Lev.2: action plan			Lev.1: simplified impact calculation Lev.2: action plan simulation	
Prod. systems	Milk/meat		Meat and Dairy	Milk	Milk/Meat
Target	Farmers/advisors/Policy Makers		Advisors/ Policy makers	Farmers/advisors	Farmers/advisors/ Policy Makers
Data collection	30 min to 3 hours	30 min to 2 hours	Not evaluable	20 minutes	1 hour
Inputs, n	40 to 150	40 to 100	Territorial data	20	75 to 100
Impact categories	Climate change, Acidification, eutrophication, Energy consumption, Economics, Labour		Climate change, Economics, Labour.	Climate Change	Climate change, Energy and Water, Economics, Labour
Carbon seques.	Yes	YES	NO		YES
Enteric Methane estimates	IPCC, 2019; Modified Tier 2 with local equations		IPCC, 2019 Tier 1	IPCC, 2019; Modified Tier 2 with local equations	IPCC, 2019; Modified Tier 2/Tier 3
Digestibility	Variable	FIxed	Not Accounted	Variable	
Manure Methane	IPCC, 2019				-
N. emission coeff.	IPCC, 2019 and local developed equations		-	Local developed equation	Nitrogen balance
Purchased feeds coeff.	Ecoinvent		-	Local Values and Ecoinvent	-
Produced feeds coeff.	LCA and IPCC 2019		-	LCA and IPCC 2019	-
Energy emission coeff.	National values				
Spatial data on GIS layers	NO			YES	