

# Reduction of Agricultural Greenhouse gases Emissions Through Innovative Cropping systems - LIFE AGRESTIC -

**PROJECT LOCATION:** Italy (Emilia-Romagna, Toscana, Puglia)

**BUDGET:** Total 3,940,804 €

% EC Co-funding: 60%

**DURATION:** 01/01/19 - 30/06/23

## PROJECT'S IMPLEMENTORS:

- Coordinating Beneficiary: HORTA Srl
- Associated Beneficiaries: ERVET Spa, ISEA Srl, NBM Srl, SSSA, UCSC



**Sant'Anna**  
Scuola Universitaria Superiore Pisa



UNIVERSITÀ  
CATTOLICA  
del Sacro Cuore

# OBJECTIVES & SCOPE

**Main objectives:** Fostering the adoption of innovative and efficient cropping systems with a high climate-change mitigation potential; spreading innovative views and tools for a climate ready and resource efficient agriculture.

## **Solutions proposed & some actions:**

- Design and implement ECSs based on 4-years rotations of cereals and industrial crops with legumes/catch crops to < GHG emissions and > C sequestration and N efficiency compared to CCSs (3 sites representative of ≠ climates);
- Retrieve, characterize and multiply seeds of legumes/catch crops for future exploitation;
- Design, develop and test a prototype for continuous monitoring of soil GHG emissions;
- Calibrate and validate a biogeochemical model for GHG fluxes estimations;
- Develop, test and implement an innovative web-based DSS for a resource-efficient management of ECSs, while maintaining/increasing yield, product quality/safety and farmers' economic return;
- Elaborate KPIs, a product label and payment schemes for Ecosystem Services; analyze GHG mitigation scenarios and socio-economic effects.

# EXPECTED IMPACTS

| LIFE Performance Indicators   |  |   | At the end of the project |                | 3 years after the project    |
|---|--|---|---------------------------|----------------|------------------------------|
| Improved Environmental and Climate Performance (including resilience to climate change) | Reduction of greenhouse gas emissions (GHG)      | CO2   | -192 tons CO2/year        | -216%          | -3845 tons / year            |
|   |  | Other GHG: N2O (CO2 eq)                                 | -22 tons CO2eq / year     | -57%           | -444 tons / year             |
|   |  | CO2eq totali  | -214 tons CO2eq / Year    | -167%          | -4289 Tons CO2eq / year      |
|   | Air quality and emissions                        | NH3   | - 145 kg NH3/ Year        | -57%           | - 2893 kg NH3/ Year          |
|   | Reduction / substitution of dangerous substances | Fungicides  | - 150 l/year              | -33%           | - 3000 l/year                |
|   |  | Herbicides  | - 150l/year of glyphosate | -25%           | - 3,000 l/year of glyphosate |
|   | Water  | Losses of nitrate in freshwater                         | - 9.9 t NO3 / Year        | -57%           | - 198 t NO3 / Year           |
| Waste management  | Waste reduction                                  |   | 5%                        | 10%            |                              |
| Better use of natural resources   | Water  | Reduced water consumption                               | - 130,000 m3 / year       | -20%           | - 2,600,000 m3 / year        |
|   | Energy   | Reduced energy consumption                              | - 13,000kwh / year        |                | - 260,000 kwh / year         |
| Sustainable land use, agriculture and forestry  | Agriculture                                      | Areas of agricultural land under sustainable management | 100 ha                    | 100%           | 2000 ha                      |
|   | Soil / Land                                      | Soil Surface improved                                   | 100 ha                    | 100%           | 2000 ha                      |
| Economic Performance Market Replication   | Employment                                       | Jobs created  | 5                         |                | 1                            |
|   | Replication / Transfer                           | N . of replication / Transfer                           | 4                         | not applicable | 8                            |
|   | Reduction of cost per unit or process            | cost for N fertilizer supply in crop rotation € yr-1    | -7072 € /Year             | -57%           | -141444 € / year             |
| Communication, dissemination, awareness rising  | Awareness raising                                | Number of entities/individuals reached/ made aware      | 50.000                    | 100%           | 75.000                       |
|   | Website  | Number of visits to the website                         | 15.000                    | 100%           | 30.000                       |
|   | Behavioural change                               | Number of entities/individuals changing behaviour       | 15                        | 100%           | 300                          |

# POLICY IMPLICATIONS

- ❑ [Paris Agreement goals \(2015\)](#) AGRESTIC will allow the private agri-food sector to contribute reducing GHG emissions and to cooperate with public administrations in defining innovative climate policies.
- ❑ [“A Roadmap for moving to a competitive low carbon economy in 2050” COM\(2011\)112 final](#) AGRESTIC will carry out demonstration activities to test the potential of N and C Efficient Cropping Systems to contribute to the target fixed for agriculture by the Roadmap.
- ❑ [Directives 2016/2284/EU & 2000/60/EC \(Clean Air Programme & EU Water Framework Directive\)](#) the use of N<sub>2</sub>-fixing crops and the more efficient management of N inputs in the innovative cropping systems through a DSS will mitigate ammonia volatilization and nitrate leaching.
- ❑ [EU Thematic Strategy for Soil Protection COM\(2006\)231](#) AGRESTIC will improve soil health, increase organic matter and reduce erosion.
- ❑ [Decision 529/2013/EU & Land use, land-use change and forestry](#) AGRESTIC measures C fluxes from agricultural soils in innovative legume-based cropping systems with optimized agronomic management. Data collection and modelling enable GHG accounting complying with the rules set.

## **CONTINUATION** after the project's end

- ✓ Genotypes of selected grain legumes and catch crops will continue to be multiplied and will be commercially available as certified seeds
- ✓ DSSs for specific crops, catch crops and GHG-focused management of crop rotations will be maintained and updated
- ✓ The DSS for GHG emission reduction at cropping system level will be customized for the European market
- ✓ Tests of the ECSs will continue in 2 sites for minimum 5 growing seasons to acquire additional data, demonstrate long-term validity and support marketing
- ✓ GHG monitoring and modelling will continue for at least 1 year in 1 field site
- ✓ Product labelling and payment of ecosystem services will continue to be promoted as marketing and political tools to valorize GHG emission reduction
- ✓ Monitoring of the impact of the project actions will go on for 3 years
- ✓ Dissemination activities will continue

**REPLICATION & TRANSFER** in several EU Countries through meetings/seminars with stakeholders and Universities to spread approach and results.