

## THE PARTNERS



**West Systems s.r.l.** works worldwide on the development of technological innovation and applied research in the field of earth sciences and environmental monitoring. West Systems is coordinator of LIFE+ IPNOA project and is responsible of the planning and implementation of the two prototypes for N<sub>2</sub>O monitoring.



**The Institute of Life Sciences, Scuola Superiore Sant'Anna, SSSUP**, carries out researches in the field of plant biology, energy- and food-related crops, agro-biodiversity and agro-ecosystem sustainability. In the LIFE+ IPNOA project SSSUP is responsible for field trial, monitoring of the N<sub>2</sub>O emissions and developing scenario analysis.



The Biosphere-Atmosphere Team of the ECG (**INRA**) focuses on the analysis of biosphere-atmosphere exchanges of several chemical and biological contaminants with potential impacts on air quality, climate or vegetation, based on experimental and numerical modelling approaches. INRA will be the responsible of the cross-validation activity of the two prototypes.



The Department of Agriculture, **Tuscany Region**, has specific expertise in the sectors of agriculture, forestry, hunting and fishing and promotes policies for the sustainable development of rural areas of the region. In the LIFE+ IPNOA project Tuscany Region is responsible for the preparation of the Best Practice Manual for the mitigation of N<sub>2</sub>O emissions from agriculture.

## LINKS

[www.ipnoa.eu](http://www.ipnoa.eu)

[info@ipnoa.eu](mailto:info@ipnoa.eu) - [networking@ipnoa.eu](mailto:networking@ipnoa.eu)

Environment Life Programme Website:  
<http://ec.europa.eu/environment/life/funding/lifeplus.htm>

West Systems Srl: [www.westsystems.it](http://www.westsystems.it)

INRA: [www.inra.fr](http://www.inra.fr)

Scuola Superiore Sant'Anna: [www.sssup.it](http://www.sssup.it)

Regione Toscana: [www.regione.toscana.it](http://www.regione.toscana.it)

# LIFE+ IPNOA

## Improved flux Prototypes for N<sub>2</sub>O emission reduction from Agriculture



A European project aiming to improve the monitoring of nitrous oxide emissions from agriculture and to promote the best management practices in order to mitigate greenhouse gas emissions in Tuscany.

Project n° **LIFE11 ENV/IT/302**  
Duration: June 2012 - May 2016

With the contribution of the LIFE financial instrument of the European Union. Total project budget: 2.058.612,00 €  
EU financial contribution: 995.948,00 €

**WEST Systems s.r.l.** (Coordinating Beneficiary)  
Via Don Mazzolari 25, IT56025 Pontedera (Pi), Italy  
Ph.: +39 0587 483335



## BACKGROUND

By 2020 the Tuscany Region must achieve the EU target of reducing greenhouse gas (GHG) emissions by 20% compared to the 1990. Agriculture, responsible for about 7% of the national GHG emissions, can contribute to achieve this target.

Agricultural activities are co-responsible for the emission of the three most important GHGs: carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O). In detail, at national level, the agricultural sector accounts for around 70% of the N<sub>2</sub>O emissions. This is primarily a result of nitrogen fertilization and of the microbially-mediated nitrification and denitrification.

In order to reduce N<sub>2</sub>O emissions, optimal agronomic practices and cropping systems have to be adopted.



Field sites where monitoring of N<sub>2</sub>O emissions is carried out.

① **CIRAA:** Centre for Agro-Environmental Research  
E. Avanzi, San Piero a Grado, Pisa

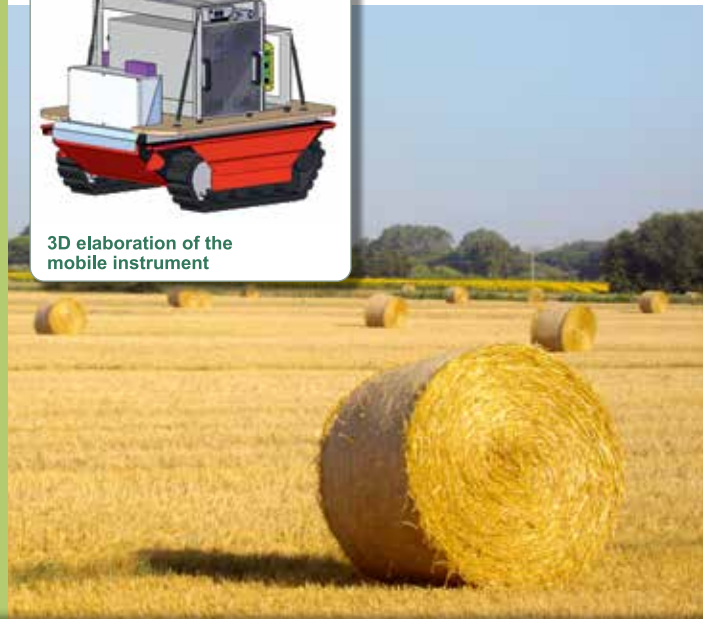
② **CATES:** Centre for Agricultural Technologies and Extension  
Services, Cesa, Arezzo

## PROJECT OBJECTIVES

1. To develop and validate two prototypes for measuring soil N<sub>2</sub>O fluxes and to improve the monitoring of N<sub>2</sub>O emissions from agricultural soils.
2. To carry out field trials in two representative sites with the aim to identify the best management practices (BMPs) for reducing N<sub>2</sub>O emissions from the main arable crops of Tuscany.
3. To scale up these BMPs from field to regional level, through suitable modelling in order to identify and to promote the measures for an effective reduction of the N<sub>2</sub>O emissions.



3D elaboration of the mobile instrument



## EXPECTED OUTCOMES

1. Development of an automatic station for continuous monitoring of soil N<sub>2</sub>O, CO<sub>2</sub> and CH<sub>4</sub> emissions and of a transportable instrument for assessing the spatial variability of the soil GHG emissions.
2. Instrument validation through the comparison of the measured data with those obtained using high-sensitivity instruments at the INRA and with those obtained during the INGOS European FP7 project intercomparison campaign.



Automatic chamber for N<sub>2</sub>O, CO<sub>2</sub> and CH<sub>4</sub> emissions monitoring

3. Production of two-year data on N<sub>2</sub>O, CO<sub>2</sub>, and CH<sub>4</sub> emissions on the main crops in Tuscany.
4. Manual of the BMPs for the reduction of the agricultural N<sub>2</sub>O emissions in Tuscany, addressed to technicians, farmers and decision-makers.
5. Analysis of regional-scale scenarios in order to identify the most effective actions for reducing N<sub>2</sub>O emissions.

**Improved flux Prototypes  
for N<sub>2</sub>O emission reduction from Agriculture**