

## NOVAGRO: Innovative organic systems for sustainable and competitive agriculture

### Riferimenti

Tipo di progetto

Gruppo Operativo

Acronimo

NOVAGRO

Tematica

Agricoltura biologica

Information

Time frame

2019 - 2022

Durata

36 months

Partners (no.)

12

Regione

Lombardia

Comparto

Cerealicoltura

Localizzazione

ITC47 - Brescia

ITC49 - Lodi

ITC4A - Cremona

Costo totale

€631.996,26

Fonte di finanziamento principale

Programma di sviluppo rurale

Programma di sviluppo rurale

2014IT06RDRP007: Italy - Rural Development

Programme (Regional) - Lombardia

Parole chiave

Fertilisation and nutrients management

Soil management / functionality

Water management

Farming practice

Agricultural production system

Sito web

<http://www.progettonovagro.it/nqcontent.cfm?id=20465>

Project status

completed



### Objectives

Organic Farming has been indicated as a possible solution for increasing the environmental sustainability of the agricultural sector, as long as it can maintain good yields. Organic farming should guarantee appropriate revenues for farmers and an adequate organic food supply to answer a growing demand.

NOVAGRO's main objective is to promote an efficient organic agro-ecosystem, which maintains high yield level and rationalizes the use of natural resources. NOVAGRO will provide a complete overview of the solutions that can be adopted, combined with a detailed analysis of the applied strategies at the farm level.

### Activities

NOVAGRO aims to introduce: (i) innovative strategies to enhance soil fertility: precision farming technologies, conservation agriculture practices, right crop rotations, functional intercropping and appropriate cover crops; (ii) strategies for the rational management of water resources and efficient irrigation systems: irrigation systems for improving the water use efficiency; limiting weed development; preventing leaching and run-off; (iii) smart and sustainable fertilization strategies: innovative processes for the effluents treatment and sustainable distribution strategies.

### Context

The main challenge that NOVAGRO aims to address is the optimization of the agronomic, economic and environmental sustainability of the organic farming systems in Lombardy. The specific needs, therefore, refer to a series of technical solutions necessary for a sustainable organic farming which NOVAGRO aims to introduce and study in the different farms involved, also thanks to its multi-actor approach. In particular, the farmers

requests primarily to face the problem of the yield reduction derived by the organic production system. This yield drop ranges from 20 to 40%, compared to conventional agriculture, depending on the crop considered. The prohibition of the use of synthetic fertilizers also makes it clear that it is necessary to introduce effluents treatment and enhancement processes that facilitate agronomic management, enhance their fertilizing properties and allow their use over a longer period of time, especially during the crop cycle. Finally, the crops irrigation in the Lombardy region is based on inefficient irrigation systems, which can cause nutrients losses and promote weed development. NOVAGRO therefore aims to increase the agronomic, economic and environmental sustainability of the farms involved.

## Partenariato

| Role    | Azienda                                                                   | Address                                                    | Telephone   | E-mail                      |
|---------|---------------------------------------------------------------------------|------------------------------------------------------------|-------------|-----------------------------|
| Leader  | Università Cattolica del Sacro Cuore – Centro di Ricerche Biotecnologiche | Via Milano 24<br>26100 Cremona CR<br>Italy                 | 0523 599249 | edoardo.puglisi@unicatt.it  |
| Partner | Consorzio Agrario di Cremona                                              | Via Monteverdi 17<br>26100 Cremona CR<br>Italy             |             |                             |
| Partner | Condifesa Lombardia Nord-Est                                              | via Malta, 12<br>25124 Brescia BS<br>Italy                 | 030 2548562 | segreteria@codifebrescia.it |
| Partner | Associazione Italiana per l'Agricoltura Biologica (AIAB) Lombardia        | Via da G. Palestrina 9<br>20124 Milano MI<br>Italy         |             |                             |
| Partner | Azienda Agricola Cà Bianca di Gruppi Gianpiero                            | Cascina Cà Bianca<br>26865 San Rocco al Porto LO<br>Italy  |             |                             |
| Partner | Migliorati Emanuele e Maddalena s.a.s.                                    | Via Cerioli 17<br>26030 Cappella de' Picenardi CR<br>Italy |             |                             |

| Role    | Azienda                                                      | Address                                                                                | Telephone | E-mail |
|---------|--------------------------------------------------------------|----------------------------------------------------------------------------------------|-----------|--------|
| Partner | Setti Liliana Laura                                          | Via Matteotti 19<br>26037 San Giovanni in<br>Croce CR<br>Italy                         |           |        |
| Partner | Azienda Agricola Corte Piccola di<br>Begatti Mauro e C. s.s. | Via Maggiore 3<br>26034 Piadena CR<br>Italy                                            |           |        |
| Partner | San Martino di Boldini F.lli<br>Società agricola s.s         | Strada per S. Lorenzo<br>- Cascina Cidellara 1,<br>26031 Isola Dovarese<br>CR<br>Italy |           |        |
| Partner | Filippini Simone                                             | Via Vittorio Veneto 7/c<br>25020 Cigole BS<br>Italy                                    |           |        |
| Partner | Co.A.Fra. Società Agricola<br>Cooperativa Sociale            | Via Al Cavarott, C.na<br>Nibai<br>20063 Cernusco sul<br>Naviglio MI<br>Italy           |           |        |
| Partner | Azienda Agricola Villaretta di<br>Ferrari Gianluca           | Cascina Villaretta<br>26024 Paderno<br>Ponchielli CR<br>Italy                          |           |        |

## Pratiche abstract

### Description

Effect of the composition of the cover crops

The effect of the specific composition of cover crops communities (e.g. diversity and species richness of cover crops) on (i) plant-microorganism interactions, (ii) bioavailability of N and P, (iii) degree of diversity and expression of genes involved in the biogeochemical cycles of C, N and P through molecular investigation and (iv) specific enzymatic activity (Esterases and enzymes involved in the C, N and P cycles).

### Description

Development of microbiological soil quality indicators:

Development and application of microbiological indicators of soil quality involved in the nutrient cycle (eg Protease and Phosphatase) and in plant growth factors (eg ACC deaminase, auxin synthesis, atmospheric nitrogen fixation, phosphorus

solubilization).

## Description

### Innovative irrigation management

The application of drip irrigation systems (compared with sprinkler irrigation) will reduce water consumption, improve water use efficiency, reduce infestation and management costs, and contain costs and energy requirements

Starting from a good knowledge of soil hydrology, the relations between soil-plant-atmosphere will be studied and evaluated using forecasting models. These will allow to simulate the development of the root system of plants and the fate of nutrients in the soil. The calibration and validation processes will be carried out with real field data.

## Description

### Fertigation of crops with the use of microfiltered slurry

Drip irrigation will allow (i) to reduce water waste, (ii) to mitigate weed development, (iii) to fertilize by applying readily available nutrients during the growing season and enhancing livestock effluents. The effects on GHGs emissions and on C sequestration will be measured. Frequency and timing of intervention will be regulated to reduce N losses (leaching, volatilization) and reduce environmental impact.

## Description

### Evaluation of worm-compost effects

An in-depth analysis will be carried out for evaluating the effects of the use of worms-compost on the N use efficiency (NUE) of the solid fraction of livestock effluents. In addition, in-depth assessments of the biochemical and microbiological dynamics induced will be determined (analysis of the degree of diversity and expression of genes involved in the biogeochemical cycles of C, N and P, and of specific enzymatic activity)

## Description

### Precision variable rate seeding

The new types of seeders, combined with variable-rate seeding technology, will allow greater seeding rates to be applied to the most productive areas and, on the contrary, to reduce doses where productivity is lower, thus improving crop yield and saving resources /input. Remote sensing in combination with sensor technology

The images will be acquired by flight of Drones and by Satellite (Sentinel 2). The post-processing of the data collected will consist of: (i) production of the output in digital format containing the result of the processing of the multispectral dataset aimed at producing a model containing the vegetative state indices (NDVI); (ii) production in paper and digital format of the vegetative state conditions derived from the NDVI index and vectorized according to the ESRI Shapefile and DWG formats.

## Description

### Organic, conservation and precision farming systems.

The principles of conservation agriculture (reduction of tillage, crop rotation, permanent soil cover), especially when combined with precision farming technologies, have been widely suggested as a key strategy to increase the potential for C sequestration and mitigation of GHGs. Furthermore, the combination of conservation agricultural practices and technological innovations, in this sense, can favor a more efficient use of resources and nutrients, reducing waste and environmental losses, improving soil properties and yields

### Description

#### Precision soil mapping

The ARP device is an automatic system for detecting soil resistivity, which acquires and processes electrical resistivity data and GPS coordinates in real time. Soil samples from homogeneous areas are analyzed to identify the intrinsic properties of the soil that have the greatest influence on the resistivity data and, consequently, on the characteristics of soil quality.

### Link utili

| Titolo/Descrizione                   | Url                                                                                                                         | Tipologia       |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|-----------------|
| Sito web del progetto                | <a href="http://www.progettonovagro.it/nqcontent.cfm?a_id=20465">http://www.progettonovagro.it/nqcontent.cfm?a_id=20465</a> | Sito web        |
| opuscolo finale del progetto Novagro | <a href="http://www.progettonovagro.it/nqcontent.cfm?a_id=24853">http://www.progettonovagro.it/nqcontent.cfm?a_id=24853</a> | Materiali utili |

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