Expected Results

It is expected that the combination of Conservation Agriculture with Smart Agriculture will offer solutions to the above-mentioned problems:

- ✓ **Impact reduction of conventional agriculture on soil degradation and nitrate pollution**
- ✓ **Mitigation of climate change through reduction of fossil fuels consumption for soil preparation and incorporation of atmospheric CO_2 as organic carbon into the soil**
- ✓ **Crop rotations for improving agricultural land management through cultivations that utilize different root zone depths and the use of legumes that enhance fertility**
- ✓ **Contribution to agriculture adaptation to climate change through:**
  - **improvement of fertility**
  - **prevention of erosion**
  - **enhancement of soil biodiversity**

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Partners

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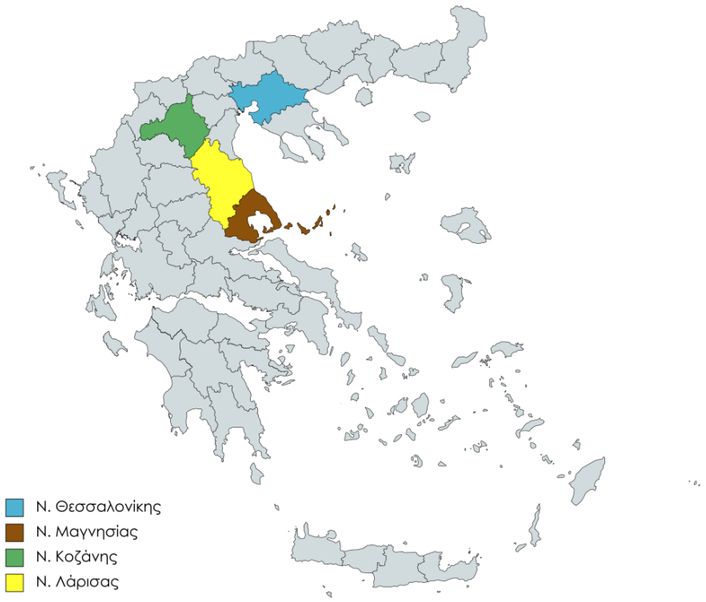

Contact

Athanasios Balafoutis – Coordinator
a.balafoutis@certh.gr

www.preconagri.gr

eip-agri
AGRICULTURE & INNOVATION

Project Duration: February 2023 – August 2025

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Sustainable soil management and **precision agriculture** techniques to ensure the viability of arable crops

EUROPEAN AGRICULTURAL FUND FOR RURAL DEVELOPMENT
Europe investing in rural areas
HELLENIC REPUBLIC
MINISTRY FOR RURAL DEVELOPMENT AND FOOD
RURAL DEVELOPMENT PROGRAMME FOR GREECE
ΕΣΠΑ 2014-2020
ανάπτυξη - εργασία - αλληλεγγύη
Co-funded by Greece and the European Union

Problems faced by Greek agriculture

1. **High soil degradation** due to the sloping terrain in a large extent of agricultural land and the intensive mechanical processing traditionally applied to these areas

2. **Compression from the destruction of soil structure** due to intensive tillage and frequent disorderly machine passage

3. **Irrational use of nitrogen fertilizers**, which beyond increasing production costs leads to non-utilization of nitrogen fertilizers, pollution of surface and underground waters with nitrates

4. **Increased fuel consumption** and the corresponding **greenhouse gas emissions**

Objective of PreConAgri

The project PreConAgri aims at the implementation and evaluation under real production conditions of an alternative cultivation scheme for wheat

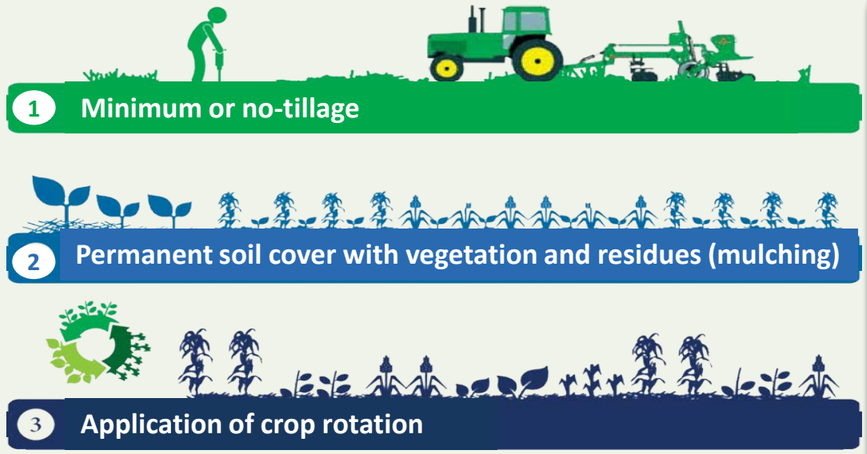
→ Methods of Conservation Agriculture
- Minimum or no-tillage
- Application of crop rotation
- Permanent soil cover with vegetation and residues (mulching)

→ Methods of Smart Agriculture
- Application of variable rate fertilization
- Controlled traffic farming (CTF) coincidental with estimation of optimal pathways inside and outside the plots

Conservation Agriculture

Conservation Agriculture (CA)* combines minimum or no tillage, permanent soil cover and crop rotations adapted to the crops and local conditions, aiming to protect the soil, conserve natural resources, improve biodiversity fertility and yields.

*European Conservation Agriculture Federation – ECAF



This is an internationally established practice, which undoubtedly offers substantial cost reduction through the elimination of soil tillage. CA started as an alternative cultivation scheme to face mainly environmental problems and was first implemented in the USA in the 1930s.

Benefits of Conservation Agriculture
- **Prevention of degradation**
- **Improvement of soil fertility through organic matter increase**
- **Increase of natural biodiversity**
- **Restoration of the natural soil structure**

Recently, the CA has acquired a new ecological dimension. The incorporation of atmospheric carbon dioxide as organic forms into the soil is the key to tackling climate change. In this context, CA is expected to be the key component of **Carbon Farming**.

Smart Agriculture

The term **Smart Agriculture** refers to a modern model of integrated agricultural management that aims to increase yields, optimise human labour, increase profitability and reduce costs using Information and Communication Technologies.

The application of Variable Rate Fertilization (VRF) was one of the first techniques attempted, in which the exact amount of fertilizer needed is applied, reducing the overall application amount without decreasing the availability of nutrient components for each specific crop.

Controlled traffic farming (CTF) is a well-known practice in some European countries but remains unknown in Greek agriculture. The aim of PreConAgri project is to combine controlled passage by using intelligent systems to estimate optimal pathways in and out of the field, because the transition between different plots requires a lot of time and increases fuel consumption.

Benefits of Smart Agriculture
- **Better utilization of nutrient components by diagnosing the spatiotemporal fertilization needs of crops through variable rate fertilization practices**
- **Energy saving and reduction of greenhouse gas emissions by finding optimal pathways for agricultural machinery**