

# MEDITERRANEAN SOUTH

## RESPONSIBLE PARTNER

UPCT, (Spain)

## COORDINATION



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## Objective

The vegetables and cereals cultivation in the Mediterranean region are mainly threatened by low availability of nutrients due to  $\text{pH} > 7.5$ , with the need to continuously add fertilizers. Most of the nutrients added precipitate in soil fast owing to the high pH, remaining unavailable for the crops. In addition, the high use of pesticides and monocultures are increasing pest/disease resistances, with more dependence to use more products, that may have negative effects on soil organisms. The climate conditions of the area favour soil organic matter degradation, which linked to monocultures and intensive tillage leads to soil degradation. In general, there is farmers are concerned about the difficulties in maintaining high crop yields due to soil nutrient depletion, pests and diseases. However, there is still lack of information about how the management of soil biodiversity can enhance the resilience of their farms and increase availability of nutrients and resistance to pests/diseases while decreasing the use of external inputs but maintaining the same yields.

There are two ways to tackle these problems: proper management of biodiversity by nature-based solutions and technology, which may evolve in parallel. With SoilDiverAgro we aim to make a proper use of biodiversity by use biotechnological products based on microorganisms to increase soil nutrient availability, decrease the incidence of soil-borne diseases, increase soil organic matter and water retention, by decrease of chemical inputs. This will be associated with proper selection of crop diversification to enhance the functionality of soil macro and microorganisms, responsible for enhancing soil health, and so productivity. This is one of the challenges in the Mediterranean agriculture, and the results of this project, properly transferred to farmers, policy-makers and land managers may contribute to increase farm sustainability with the decrease of external inputs, by increasing soil biodiversity.

## Stakeholders consultations



### DISCUSSION GROUP

📅 15.09.2020 | Cartagena, Spain (Online)

Share the main agronomic problems identified by surveys on **potato production**

**8 PARTICIPANTS:** Farmers, researchers, agribusiness

📅 16.09.2020 | Cartagena, Spain (Online)

Share the main agronomic problems identified by surveys on **wheat production**

**16 PARTICIPANTS:** Farmers, researchers, agribusiness



### REGIONAL MEETING

📅 15.09.2020 | Cartagena, Spain (Online)

Solutions for wheat and vegetables cultivation by the management of **soil biodiversity**, searching to find the relationship between soil biological groups, crop production and quality

**19 PARTICIPANTS:** Farmers, researchers, agribusiness



### TRAINING DAYS

To be confirmed



### **OTHERS**

To be confirmed



### **FIELD DAYS**

To be confirmed



### **NEXT STEPS**

A minimum of 2 field days per year will be organised to inform and consult stakeholders and everybody interested.



## CASE STUDY 1

Use of soil biodiversity to reduce soil-borne diseases/pests incidence and increase nutrient availability in potatoes cropped in multiple cropping and rotations.

### OBJECTIVE

The objective of this case study is to increase soil nutrient availability and soil water retention capacity and reduce soil-borne diseases/pests incidence to decrease production costs.

### PROPOSED PRACTICES

We will check better optimal multiple cropping and rotations to enhance soil fertility and biodiversity and reduce soil-borne diseases/pests incidence, integrated pest control and addition of nutrient solubilizing biological agents (plant growth promoting bacteria (PGPB) and fungi).

### STATE OF THE ART

The potatoes and vegetables cultivation in the area is highly intense in external inputs to increase fertility (inorganic fertilizers and manure), reduce the incidence of diseases/pests (pesticides) and increase yields (irrigation water). Multiple cropping and rotations are common, but not optimized to maximize the development of soil organisms.

## PROGRESS WITH THE CASE STUDY IN RELATION WITH THE STATE OF THE ART

Finding adequate crop rotations/multiple cropping to manage soil biodiversity, not performed so far. Assessment of PGPB and fungi on soil biodiversity, since it has been proved their efficiency to enhance yields, but little is known about their effect on native microbial communities and time evolution. Maybe plant combination and organic matter addition could enhance native soil biodiversity with no need for bioaugmentation.

## PROBLEM TO SOLVE

The vegetables cultivation in the area are mainly threatened by low availability of nutrients due to pH > 8, with the need to continuously add external inputs, the excessive use of water and the presence of cyst nematodes. This makes productions costs be high.



## CROPS



## LOCATION

Cartagena (Spain)

## PARTNERS

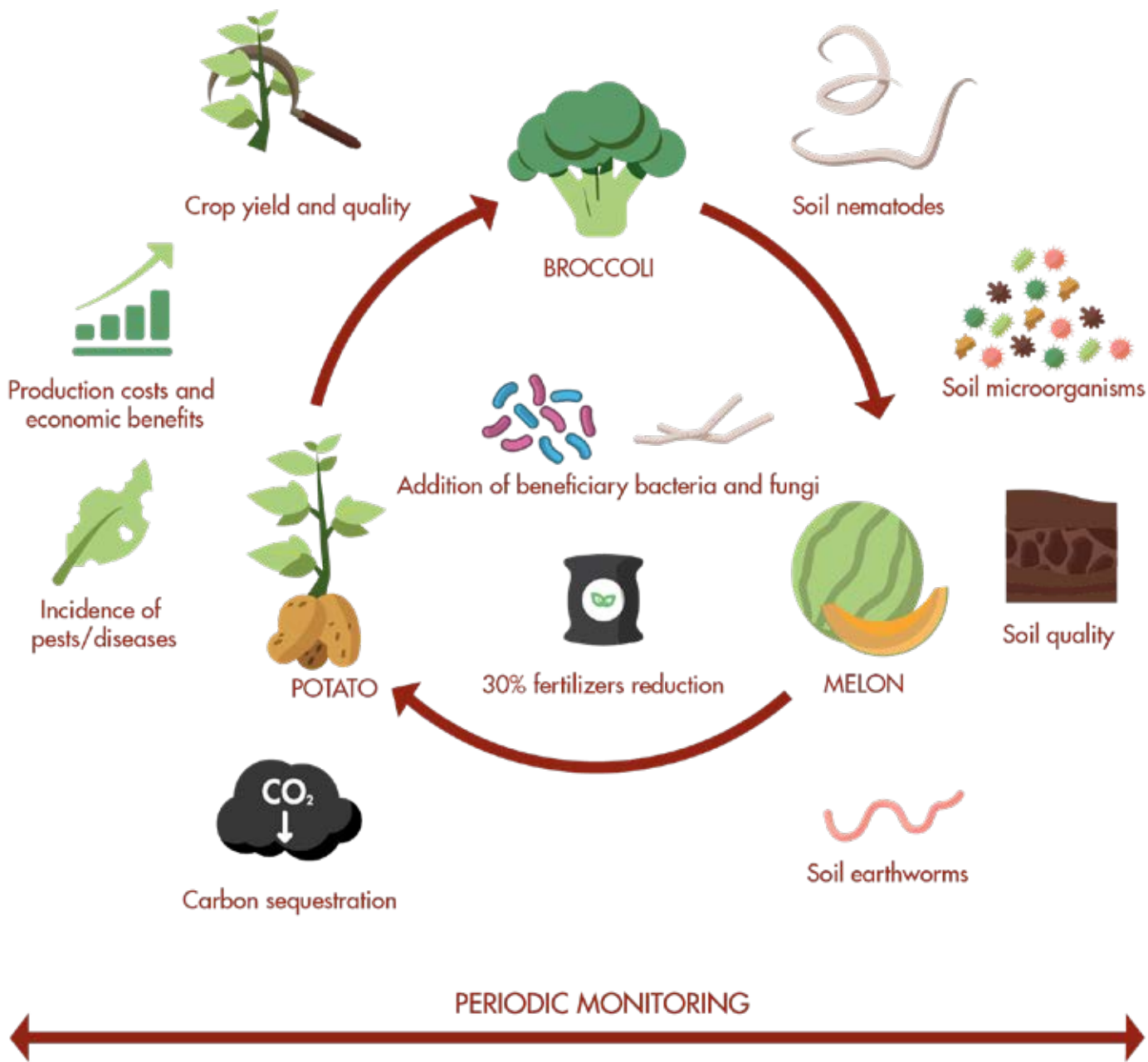
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## CROPPING SYSTEMS

Crop rotation & Addition of nutrient solubilizing biological agents (plant growth promoting bacteria (PGPB) and fungi).



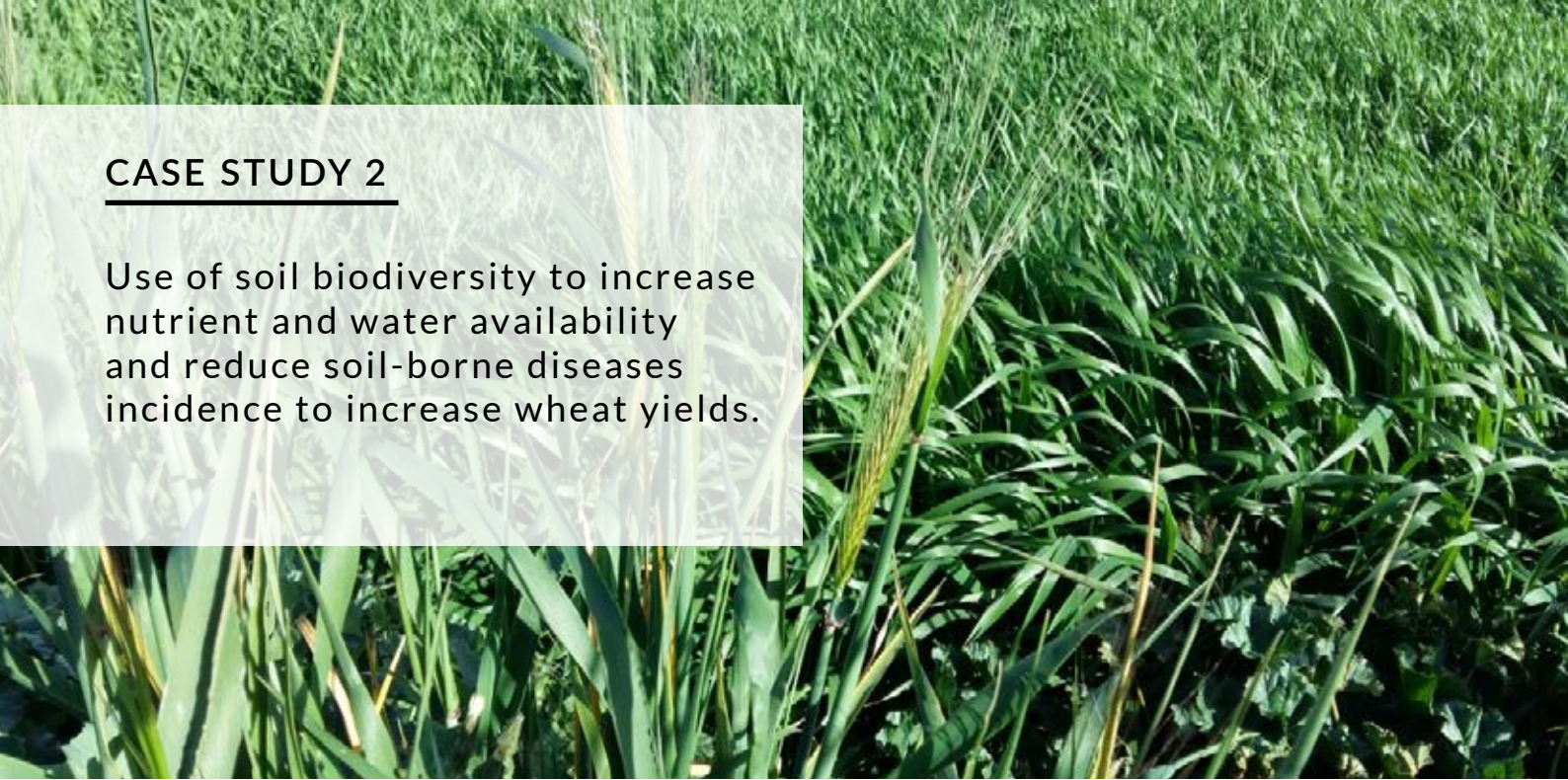
→ Infographic for case  
study 1 made by UPCT





## CASE STUDY 2

Use of soil biodiversity to increase nutrient and water availability and reduce soil-borne diseases incidence to increase wheat yields.



### OBJECTIVE

The objective of this case study is to increase nutrient and water availability and reduce soil-borne diseases incidence to increase wheat yields.

### PROPOSED PRACTICES

We will introduce multiple cropping and rotations to enhance soil fertility and biodiversity and reduce soil-borne diseases/pests incidence, add green manure to improve soil structure and soil water holding capacity and addition of nutrient solubilizing biological agents (plant growth promoting bacteria (PGPB) and fungi).



## STATE OF THE ART

The wheat cultivation in the area is highly intense in machinery and pesticides use, with low or nil fertilization and absence of rotations, with use of fallow periods to avoid soil exhaustion by cropping.

## PROGRESS WITH THE CASE STUDY IN RELATION WITH THE STATE OF THE ART

Finding adequate crop rotations/multiple cropping to manage soil biodiversity, not performed so far with this aim. Assessment of PGPB and fungi on soil biodiversity, since it has been proved their efficiency to enhance yields, but little is known about their effect on native microbial communities and time evolution. Maybe plant combination and organic matter addition could enhance native soil biodiversity with no need for bioaugmentation.

## PROBLEM TO SOLVE

The wheat cultivation in the area are mainly threatened by low availability of nutrients due to  $\text{pH} > 8$  and low water content owing to climatic constraints, with affection of fungi after rainfall events. This makes crop yields be low.



## CROPS



## LOCATION

Caravaca (Spain)

## PARTNERS

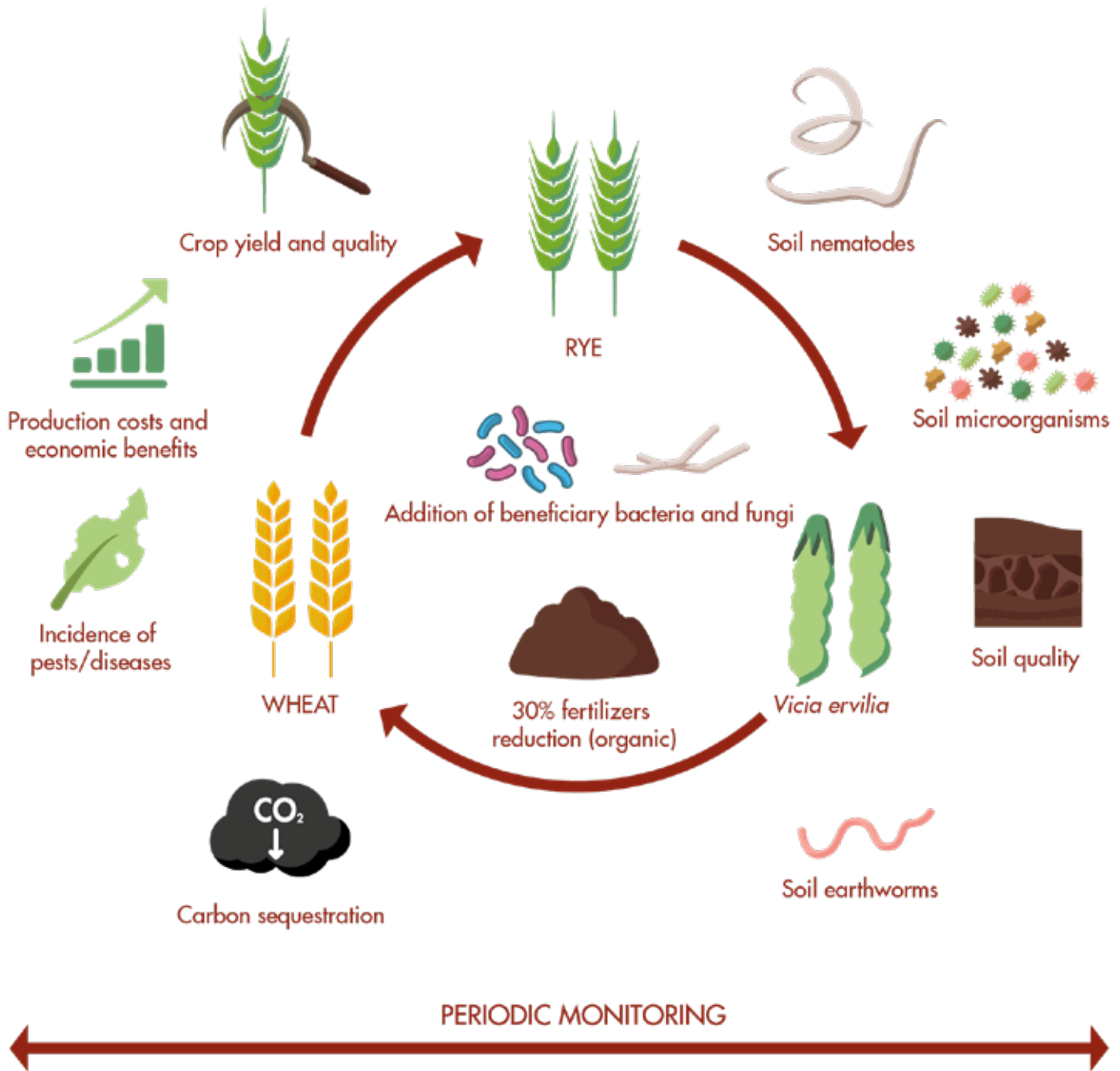
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## CROPPING SYSTEMS

Addition of nutrient solubilizing biological agents (plant growth promoting bacteria (PGPB) and fungi) & crop rotation.



→ Infographic for case  
study 2 made by UPCT

