



# the role of microorganisms in sustainable agriculture

## pilot of a documentary series

### INTRODUCTION

**Sustainability** is the capacity to continue a certain pattern of behaviour indefinitely.

- minimum environmental impact
- resilient local food systems
- affordable renewable energies
- efficient use of local resources
- minimum dependence on external inputs

Conventional agriculture might not be sustainable, since it sometimes ignores the global **environmental reality** [1].

- pollution
- food insecurity
- loss of biodiversity
- fossil fuel depletion
- climate change
- land degradation
- shortage of natural resources

**Microorganisms** influence soil fertility and can aid crops to overcome environmental challenges, supporting plant health and yield [2]. Their varied metabolism makes them a powerful option for transforming waste into resources within the overall agrarian system [3].

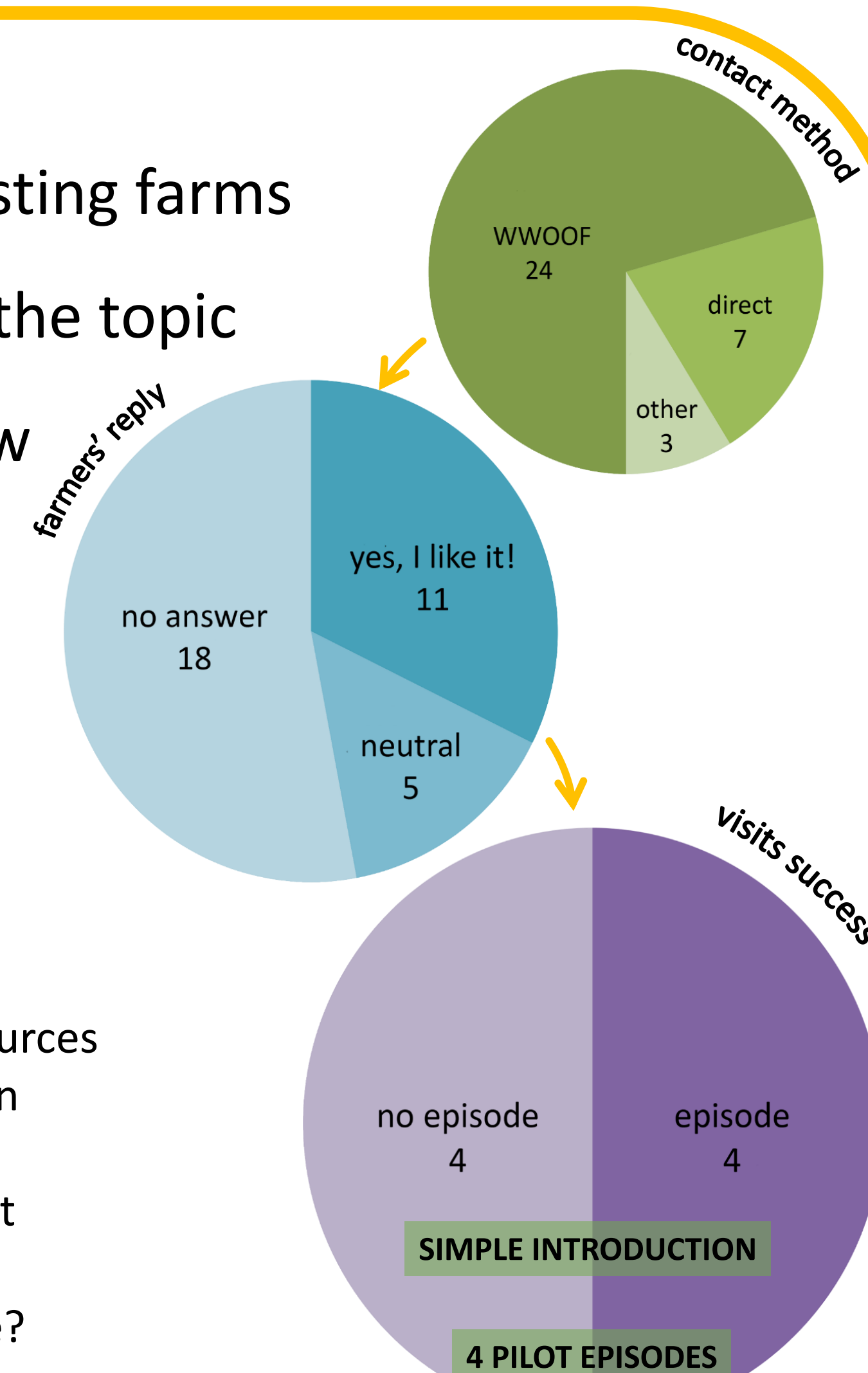
### OBJECTIVES

to provide educational material about key steps on **crop production** where microbiology can take part and enhance the sustainability of the farm flows.

- to contribute to the **communication** between science and rural context
- to awaken the **interest** for farming
- to **disseminate** it among students
- to make a route map for a **broader** project

### MAKING OF

- Contact with interesting farms
- Select and prepare the topic
- Prepare an interview
- Visit and recording
- Animations draft
- Post-production



### THE EPISODES

#### RECYCLING NUTRIENTS IN CROP RESIDUES



Decomposition occurs in natural ecosystems and allows for the recycling of nutrients. Are agro-systems inherently unsustainable because of the continuous removal of nutrients? [4]

#### PHOSPHORUS DEPLETION AND RECOVERY



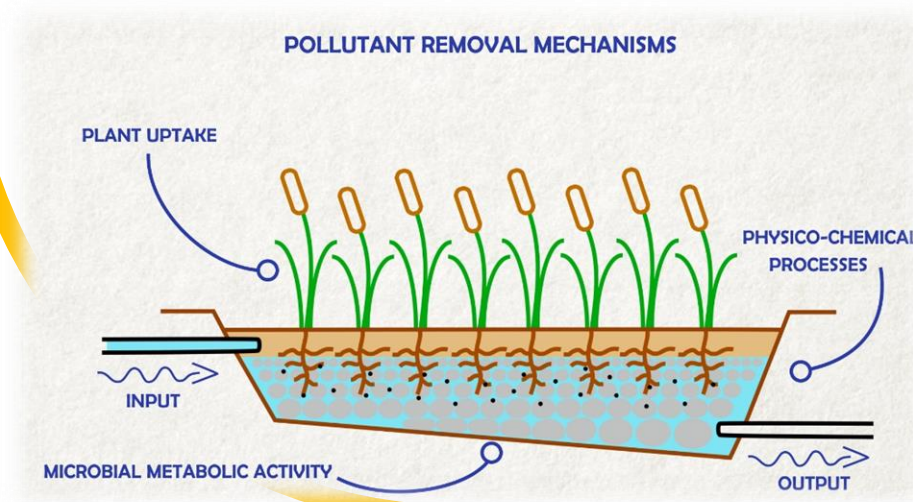
Phosphorus is a requirement for life and a dwindling resource... Can farmers recover it from waste by using microbial metabolism? [5]

#### MYCORRHIZAL SYMBIOSIS



What is this fungi-plant relationship? Which is its role in the development of a healthy crop? Can farmers benefit from it? Sometimes... but how? [6]

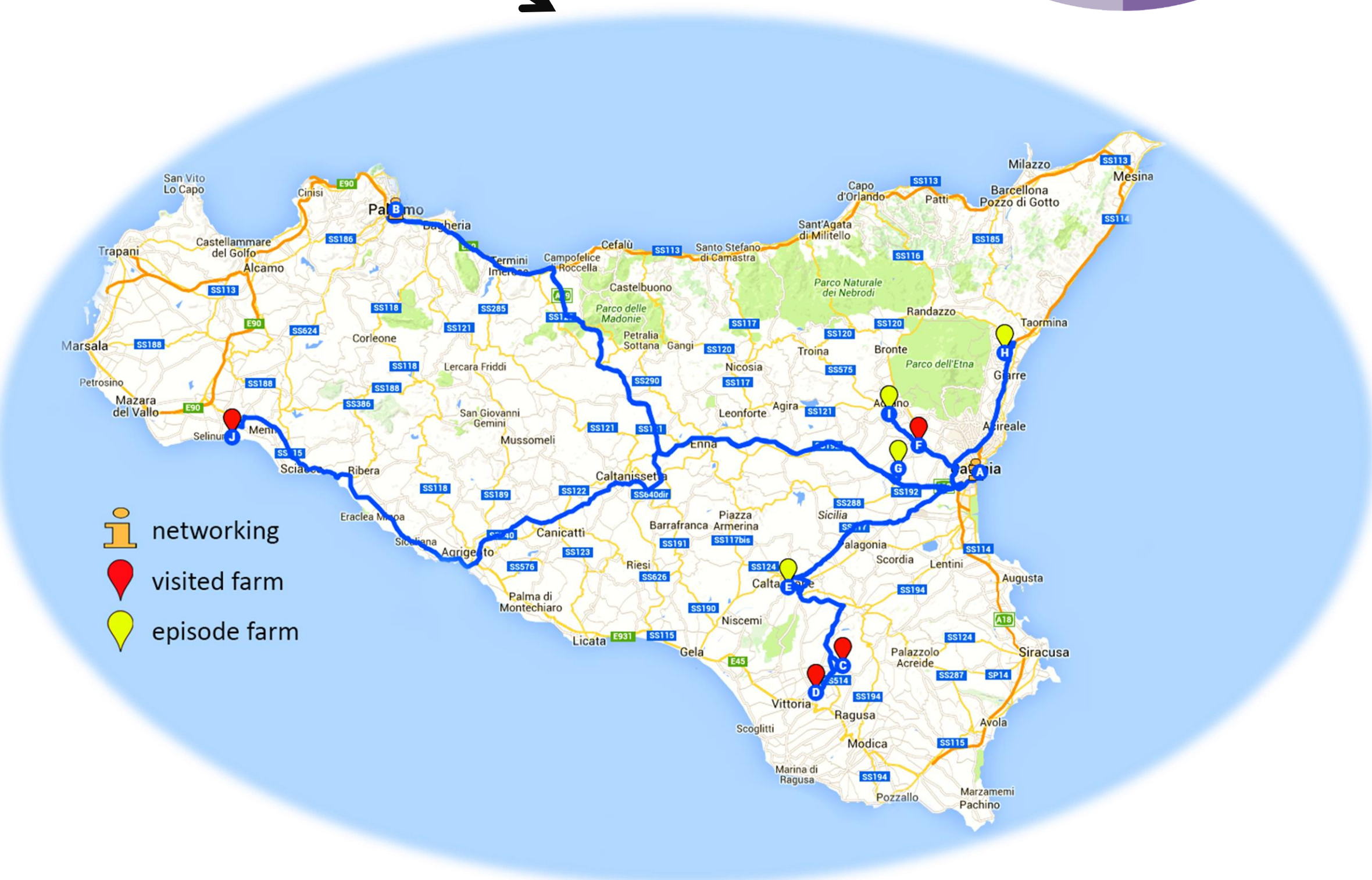
#### WASTEWATER DISPOSAL AND REUSE



Sustainability is also about caring for water, for its efficient use, treatment, reuse or disposal. What does all this have to do with microorganisms?



we are links, click us!



Pathway followed to reach a farm and eventually create an episode.

### DISSEMINATION



WHATIF ...

### WHAT NEXT?

#### Route map for a broader project

#### BASICS

Sustainable Agriculture | Soil Microbiology | Nutrient Cycling | Soil Organic Matter

#### SYMBIOSIS

Resisting Environmental Stresses | Mutualisms | Pathogens

#### MANAGEMENT

Crop Rotation | Optimizing Compost | Fertilisers | Biological Control

#### OVERALL FARM

Wastewater | Heat | Edible fungi | Food preserving and processing

#### HUMAN IMPACT

Land-use | Plant Breeding | Climate Change | Transgenics

#### INVOLVEMENT

Urban agriculture | Translation Lab-Farm

### PROBLEMS MET

#### Logistics

Climatic conditions  
Public transport incidents  
Farmers' receptivity

#### Content

Farmers' knowledge  
Too broad a topic  
Pseudoscience?

### INTEREST

Reflecting on the values that rule over the crop production is of interest for citizens in general, since we are all **dependant on the food chain**. During the development of the episodes, it became clear how unconnected **scientific and rural realities** are at some points. This is where the **social and environmental interest** of the project lies in. Apart from its **didactic value**, which provides basic knowledge of agro-systems and microbial ecology or metabolism, each episode implies some **review of the current model of crop production**.