

# Plant Health

## Health of plants in their socio-ecological ecosystem

### ABSTRACT

The issue of managing the health of cultivated plants is nowadays, due to environmental disturbances and rapid population growth, a crucial element in the future of agriculture and the preservation of human food resources. In this federative project, we propose to unite the strengths of several research units, with varied competences, in order to go beyond a classical understanding of plant health. To this end, we propose to renew the link with the primary stakeholders in plant health management, the farmers. By working on cultivated plants in the intertropical zone that have major economic and societal interests and recreating this link between researchers and farmers, we hope not only to develop new plant health indicators, but also to understand the diversity of agricultural practices and the dynamics of their implementation according to the sanitary conditions of cultivated plots. Based on farmers' perceptions of the health of their plots, we wish to understand how biotic and abiotic soil components can play a role in maintaining good plant health. The final objective of this project is to develop new paradigms in the management and implementation of original and integrative approaches to improve plant health.

**Keywords :** Plant Health, Social and technical indicators, Agricultural practices, Ecosystem, Microbiome, interdisciplinarity, Rice, Cocoa, Plantain, Cambodia, Ivory Coast

**Year :** 2020

**Project number :** 2003-003

**Type of funding :** PE

**Project type :** PC

**Research units in the network :** ABSYS AIDA AGAP ECO&SOLS GECO INNOVATION

**Start date :** 2021-12-01

**End date :** 2024-08-31

**Flagship project :** no

**Project leader :** Gilles Béna

**Project leader's institution :** IRD

**Project leader's RU :** PHIM

**Budget allocated :** 450000 €

**Total budget allocated ( including co-financing ) :** 450000 €

**Funding :** Labex

### GOAL

We have gathered a community of researchers with complementary skills from various disciplines (biological sciences, epidemiology, plant pathology, microbiology, ecology, evolution, agronomy, social sciences, economy, ethnology) belonging to 8 units from the Agro Labex. The present project was co-constructed by the whole group during 8 months (Nov. 2020 – May 2021). Building on the strengths already present within the group, the objective of the Plant Health project is double:

- 1) to create, structure and animate an interdisciplinary consortium centred on Plant Health within the Agro Labex community;
- 2) to conduct “proof-of-concept” interdisciplinary research on specific survey sites (two countries, three crops) targeting the definition of new indicators and criteria of plant health, and identifying virtuous agronomic practices that foster plant health, especially by deciphering the microbiota in order to identify its beneficial members or interactions and to promote them, thereby reducing the use of pesticides. These two objectives will be tackled in parallel and will feed each-other. The project is organized in four work- packages, the first three being dedicated to field research, and the last one dedicated to the building, structuration and animation of the interdisciplinary consortium and to the project management.

We collectively choose to focus the research part of the project on three specific crops distributed on two survey sites: rice in Cambodia, cacao and banana in Ivory Coast. These three situations were selected because working forces and local collaborations were already available through various ongoing projects.

## **ACTION**

WP1: Building global indicators of plant and agroecosystem health

WP2: Crossed analysis of field practices with assessment of plant health indicators in order to identify virtuous practices

WP3: Understanding the processes (microbiome dynamics & socio-cultural processes of innovation) allowing the optimization of plant and agro-ecosystem health

WP4: Project management and Interdisciplinary dynamics through transversal activities