



## CA-SYS: CO-DESIGNED AGROECOLOGICAL SYSTEM EXPERIMENT

Long term experimental platform  
on agroecology at various scale



## Project leaders



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# Objectives of the CA-SYS Plateform

- Design and evaluate different **agroecological systems**
- Study the **transition** towards these agroecological systems (Agronomical performance, evolution of farming practices, multi-performance during the shift towards new ecological equilibria...)
- Breed **new varieties** adapted to agroecological conditions (Tolerant to multiple stresses, enhancing beneficial plant-microbe interactions...)
- Understand the **biological processes** underlying the functioning of agroecological systems
- Develop / update current **experimental methods** to create knowledge on agroecological systems



## Different agroecological systems

An **agroecological system** comprises adjacent fields farmed with one (or a few) cropping systems. These fields interact with semi-natural habitats located in the surrounding landscape (woods, hedges, grass margin strips, flower strips). The spatio-temporal arrangement as well as the management of fields and the semi-natural habitats are considered as a complete strategy implemented to meet specific goals (e.g. multi-performance, biodiversity, etc...)

**The agroecological systems tested in the CA-SYS platerform consist of:**

- A substantial amount of semi-natural habitats to enhance pest natural enemies
- Four cropping systems combining a large diversity of farming practices



## Some ambitious objectives

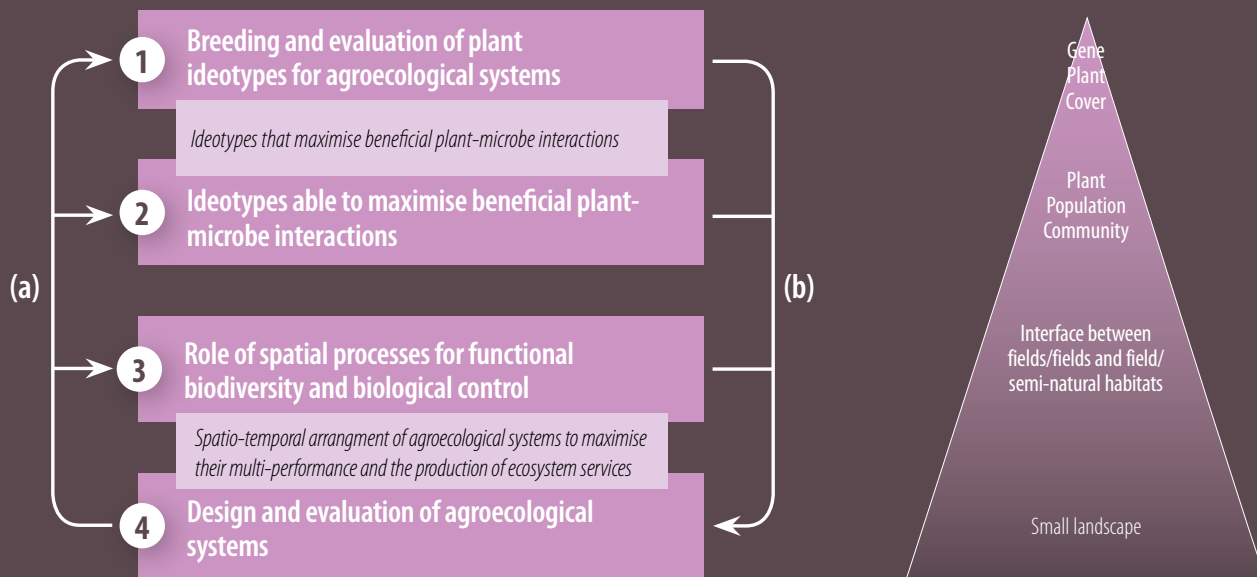
**Targetted increases in the multi-performance of systems**

- Profitability and productivity identical to neighbouring farmers over a 10 year-horizon
- Low environmental impact

**By maximising the use of biological processes** (biological control of pests, improving nitrogen cycling...)

**By drastically reducing the use of pesticides**

# > Genral framework: four themes



- (a) The establishment of contrasted cropping systems (Theme 4) will offer contrasted agroecological conditions to conduct specific studies in Theme 1, 2 and 3 (*assessment of biological processes, evaluation of varieties...*).
- (b) The Knowledge derived from Theme 1, 2 and 3 will contribute to the design and evolution of the agroecological systems under test.

## ● Explore two main agricultural practices

NO-TILL & COVER-CROP BASED SYSTEMS

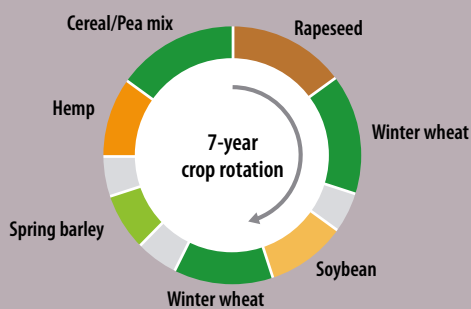


TILLAGE-BASED SYSTEMS



## ● Explore two levels of crop diversification

EXPLORE TWO LEVELS OF CROP DIVERSIFICATION



Example of crop rotation

TEMPORAL DIVERSIFICATION + SPATIAL DIVERSIFICATION



Mixture of crop/cover crop species and varieties

# > An innovative experimental framework

## NESTING FACTORIAL EXPERIMENTS IN SYSTEMIC EXPERIMENTS

- Systemic experiments to design and assess agroecological systems
- Factorial experiments to test new varieties/mixture in agroecological conditions and to understand the effect of specific practices (e.g. cover crop termination tactics)
  - ▶ In each field, a specific area is dedicated to factorial experiments

## THREE ZONES OF CONTRASTED CROPPING SYSTEMS EMBEDDED WITHIN A LANDSCAPE OF SEMI-NATURAL HABITATS

- Zone 1: No-till & cover crop based-systems only
- Zone 2: Tillage-based systems only
- Zone 3: Zone mixing fields of no-till and tillage-based systems
  - ▶ To test the effect of the spatial distribution of practices (homogeneous in Zone 1 and 2 vs. heterogeneous in Zone 3 on the spatial distribution of organisms and ecological processes)

