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PARIS-SACLAY



UMR1402

INRAE, AGROPARISTECH

Functional Ecology and Ecotoxicology of Agroecosystems (ECOSYS)

Management

Sabine HOUOT, head
Cyril GIRARDIN, deputy head

Key figures

- 50 researchers and teacher-researchers
- 40 PhD and post-doctoral students
- 37 engineers
- 31 technicians and administrative staff

Experimental and analysis Infrastructures

- 1 ICOS site
- 1 PRO site (AnaEE-France)
- Biochem-Env (AnaEE-France)
- PTR-MS (AnaEE-France)
- 150 m² of greenhouses, growing rooms and mesocosmes

Patrimonials Sites

- 42 plots
- 36 plots
- Testing place Dehérain

Mission and objectives

Our researches belong to the global changes context and the urban influence development on agricultural soils and bears on the agroecosystems operation in interaction with the environment. They use the agroecology helps to minimize and adapt themselves to the climate changing, to show that agriculture participate to the ground bioeconomy and to aim towards a global health approach.

The aims are:

- To understand the biotic and abiotic interactions influence (biodiversity, pathogens, soil, climate, infectings,...) on the ecosystem functioning;
- Setting external forcings and technical actions to regulate this functioning (nitrogen alternative origins, pesticides, organic wates recycling, soil labor, varieties/species choices,...);
- Developing clear patterns at corresponding scales from the molecular scale to the plot, then to the land then to the landscape.



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Our researches gather functional ecology ideas, physics, and chemistry transfers through, for example, the flow analysis between the biosphere compartments, the interactions study between biological functions and environmental factors and the plasticity study of the plants. Our final goals consist to propose some diagnostic and prognosis tools and patterns which can be used at forecast, testing and decisional help aims.



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T Agroecosystems
& Environment

T Digital Sciences &
Systems Modelling

T Plant Science, Diversity,
Health & Biotechnology

T Territories, Governance,
Innovation in Society

Topics

Research

Our unit is organized in 3 disciplinary scientific teams:

- Soil science
- Ecotoxicology
- Ecophysiology and physics-chemistry interactions biosphere –atmosphere (Eco&Phy).

These disciplinary teams feed 4 framing themes which goals are:

- **Theme: "Biomasses running, production and recycling"**
Maximize the recycling and the non-alimentary biomasses running.
- **Theme: "Climate change and agroecosystems: softening and adaptation"**
Quoting and modeling the agroecosystems help to the greenhouse gas and spray outputs; suggesting strategy to reduce greenhouse gas outputs, increasing carbon reserves and decrease the bioagressors pressure.
- **Theme: "Contaminants in agroecosystem: exposure and impacts"**
Assess and forecast contaminants transfers related to agricol activities, linking contaminants impact to soil offices, suggesting reducing strategies to infectings on environment and health.
- **Theme: "Diversity from the plots to the landscape for a resilient agroecosystem"**
Identifying the (natural and grown) diversity allowing increasing the agricol systems resilience reducing their addiction to synthetic inputs and reducing their impacts.

Collaboration

ECOSYS exists inside a "research ecosystem" linked to the future Campus Agro Paris-Saclay: strong links with the convergence institute CLAND, with the interdisciplinary subject C-BASC and its development inside the Paris Saclay university and with the Île-de-France research federation (FIRE). The partnership is also rich with implementing territories actors (Terre & Cité, Plaine de Versailles), jointed and technologic nets like Bouclage et Sol et Territoire RMTs.

Teaching

The ECOSYS unit is implied in the department trainings SIAFEE (Water and Environment Agronomic and Forest Ingengering), of AgroParisTech and of Graduate Schools BIOSPHERA (Biology, Society, Ecology & Environment, Resources, Agriculture and Food) and « Geoscience » of the Saclay University. It is implied among in the mention coordination of Agrosiences, Environment, Territories, Landscape, Forest (AETPF) as well in "Climate, land use, ecosystem services" (CLUES), "Soils Management and Ecosystemics Services" (GSSE) and "From Agronomy to Agroecology" (AAE) of Paris Saclay University courses.

ECOSYS is linked with two Île-de-France doctoral schools: Agriculture, food, biology environment, health (ABIES) and Île-de-France Environment Sciences (SEIF).

Some forty doctoral and post-doctoral students and some fifty short-term trainees are welcomed each year.



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