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UMR0211

INRAE, AGROPARISTECH

Agroecosystems and Environment: AE

Territory, Governance, Innovation in Society: TGIS

Agronomy joint research unit (UMR)

Management

Arnaud Gauffreteau, director
Muriel Valantin-Morison, deputy
director

Research areas

- Agronomic innovations for sustainable agricultural and food systems
- Biodiversity and associated ecosystem services
- Climate change, diversification and yield instability

Keys figures

- 15 researchers and teacher-researchers
- 8 doctoral and post-doctoral students
- 8 engineers
- 14 contractor engineers
- 11 technicians and administrative staff
- Conducting systems trials and factorial trials
- Working with stakeholders in around twenty agricultural regions in France

Mission et objectives

The UMR's collective ambition is to help agricultural systems be better adjusted and more sustainable, to face the many challenges before them - adapting to climate change, reducing their environmental impact, and accommodating evolutions in demand for food, biomass and services.

The unit's originality lies in its ability to combine approaches, not only on the level of a single agroecosystem (cropping systems and mosaics of cropping systems) but also at the territorial level, working with diverse groups of stakeholders involved in the development of agricultural practices, and at the level of broader regions of the world.



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Working at these different scales thus allows us to tackle issues such as reducing water pollution and cutting pesticide use. It also enables us to design farming systems that make use of biodiversity and the ecosystem services it provides, or that are capable of adapting to climate change. Moreover, this systemic approach makes it possible to reconnect agricultural production with food systems and to study the effects of climate change on a continental scale.

To achieve these goals, the unit is producing knowledge on the interactions between cultivated and non-cultivated habitats, pests and crop auxiliaries, and weeds and cultivated cover crops, at different scales and in relation to observed practices. We are developing intervention methods with stakeholders, especially in the context of design workshops. On a continental scale, the unit is modelling the effects of changes in crop distribution.



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Research

The UMR structures its work following strongly interwoven three lines, with no researcher assigned to any single one of them:

- Producing resources (methods, tools, knowledge) to facilitate stakeholder innovation in agri-food systems;
- Evaluating the role of different forms of biodiversity (of cultivated species, of associated wild species and of landscape infrastructures) in providing ecosystem services, and steering biodiversity towards these outcomes;
- Assessing the vulnerability of current cropping systems (especially yield instability) in the context of climate change and other global changes, and evaluating the potential of crop diversification (with the introduction of legumes or minor species, for instance) and of new production processes to improve their sustainability.

Collaborations and applications

The UMR actively collaborates with other French and foreign teams working on field and territory agronomy, especially within the framework of the IDEAS network, which was set up in 2016 to develop innovative design methods for agri-food systems. These collaborations are now extending to all the stakeholders in the areas where the UMR conducts research: chambers of agriculture, technical institutes, local authorities, water agencies, consumers, associations, etc. This is especially the case in the 'Innovative cropping systems' and the 'field- and territory-workshop' joint technology networks (réseaux mixtes technologiques - RMT).

The UMR's researchers are very often asked to take part in scientific assessment tasks conducted by INRAE on agricultural production and agroecology.

Experimental systems

These field experimentations enable innovative cropping systems to be monitored over a long period. The 'La Cage' trial was launched in 1998 in Versailles and the S.I.C. ("innovative systems under constraints") experiment was run in Grignon from 2008 to 2018. These experiments aim to analyze the performances of systems in terms of their contribution to sustainability and their impact on the environment. The Scarabée network, which extends over some thirty farmers' plots, is testing the effects of agroecological infrastructures on the biological regulation of pests.

Teaching

The unit is closely linked to AgroParisTech's SIAFEE department (Agriculture, Forestry, Water and Environment Sciences and Engineering), and many of its researchers (6 out of 15) are also teaching.

The unit significantly contributes to training:

- future researchers who will work to analyze, design and assess cropping systems and territories using the principles of agroecology;
- future agricultural engineers, who will acquire the knowledge and tools they need to help transform agriculture, both in France and abroad.



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