

## Press release

Montpellier, 7 October 2021

### Conserving agrobiodiversity to adapt crops to climate change: inauguration of two major facilities

On 6 October in Montpellier, CIRAD, INRAE, IRD and Institut Agro – alongside representatives of the Prefecture and the Occitanie Region, and Michaël Delafosse, President of Montpellier Méditerranée Métropole and Mayor of Montpellier – inaugurated two facilities that will play a major role in the adaptation of crops to climate change. The first, ARCAD, a genetic resources centre, contributes to conserving Mediterranean and tropical crop diversity, which is essential to plant breeding in the context of the agroecological transition. The second, the AbioPhen greenhouses, simulate future climate conditions.

ARCAD provides Montpellier with a world-class centre dedicated to the conservation and study of **Mediterranean and tropical crop genetic resources**. *The Agropolis Resource Centre for Crop Conservation, Adaptation and Diversity* (ARCAD), hosted by INRAE, brings together the main collections of crop genetic resources from CIRAD, IRD and INRAE in Montpellier. ARCAD is **the first French crop conservation “bank”**, and holds some 50 000 samples (vines, maize, Medicago, sorghum, durum wheat, rice, millet, cotton, fonio, groundnuts, cocoa, coffee, forest trees, etc.), in the form of seeds or in vitro plants.

#### ARCAD: conserving and managing the genetic diversity of tropical and Mediterranean plants

The centre is built in the form of an H around the seed conservation platform, at the heart of which is a **robot stacker that is the only one in Europe**. This is surrounded by three technical platforms (genotyping-sequencing, seed phenotyping, cryoconservation) equipped with the latest technologies to conserve and study this genetic diversity.

Studying the diversity of crops and their wild relatives is essential in a context of globalisation and global change. Certain heirloom or wild varieties, which are sometimes endangered, may be less sensitive to climate conditions or to the emerging diseases and plant pests that are spreading throughout the world. They can also be used as parents of new varieties that are better suited to these new contexts.

Moreover, growing a range of different species and varieties is a guarantee of resilience, especially for family farms, which provide more than half of the world’s agricultural production. This contributes to food and nutrition security. Finally, conserving, studying and disseminating this diversity by articulating the different modes of conservation in a complementary manner (in the field with farmers or in centres such as ARCAD) and by recognising the different processes and actors involved in the creation of diversity (farmers, researchers, plant breeders) are key to successful food and agroecological transitions at the global level.



The ARCAD centre is built in the form of an H around a seed conservation platform, at the heart of which is a robot stacker that is the only one in Europe © INRAE, C. Maitre

### **AbioPhen: testing varieties adapted to future climate conditions**

CIRAD's AbioPhen greenhouses, which are close to the ARCAD centre, are aimed at furthering research on adaptation to climate change in certain crops, such as rice, and subsequently examining in detail the mechanisms at work and identifying associated genetic traits. Climate conditions can all be controlled (light, temperature, humidity) and CO<sub>2</sub> can be increased up to four times the atmospheric level, enabling the greenhouses to simulate future climates: higher temperatures and atmospheric CO<sub>2</sub> levels, or drier air. These high-tech greenhouses will be used to study the behaviour of new varieties, resulting from controlled crosses or from new associations of varieties or species, in the climate conditions of the coming decades.



The AbioPhen greenhouses simulate future climate conditions © L. Rodriguez, CIRAD

## Two facilities financed by the Contrat de Plan Etat-Région (CPER 2015-2020)

The **ARCAD centre** (Agropolis Resource Centre for Crop Conservation, Adaptation and Diversity) was built in the framework of the Contrat de Plan Etat-Région for a total amount of 10.4 million euros, with financing provided by the Regional Council (6.5 million euros and provision of land) and Montpellier Méditerranée Métropole (1 million euros), and co-financing provided by partner scientific institutes (2.9 million euros): INRAE, CIRAD, Institut Agro and IRD. Bringing together 13 research units, around 100 scientists specialising in genetic resources, as well as training and hospitality facilities (in particular for the countries of the global South), this new centre strengthens the scientific dynamics of the “Feed” pillar of the MUSE I-SITE (University of Montpellier) and its international visibility.

The **AbioPhen** greenhouses were financed by the Contrat de Plan Etat-Région (3 million euros), with 1.3 million euros provided by the Regional Council and 1 million euros by the French State) in the context of RÉSEM (Montpellier network of experimental greenhouses), with co-financing provided by CIRAD (700 000 euros).

The architectural design of ARCAD and AbioPhen took account of environmental indicators, such as the management of water and waste, the use of low-impact materials, and energy efficiency.



From left to right: Valérie Verdier, President Managing Director of IRD, Sophie Béjean, Rector of Occitanie Academy, Rector of Montpellier Academy, Chancellor of Universities, Elisabeth Clavier de Saint Martin, President Managing Director of CIRAD, Philippe Manguin, President Managing Director of INRAE, Michaël Delafosse, President of Montpellier Méditerranée Métropole, Mayor of Montpellier © INRAE, C. Maitre





From left to right: Khaled Bouabdallah, Deputy Rector for Higher Education, Research and Innovation for the Occitanie academic region, Elisabeth Claverie de Saint Martin, President Managing Director of CIRAD, Sophie Béjean, Rector of Occitanie Academy, Rector of Montpellier Academy, Chancellor of Universities, Philippe Manguin, President Managing Director of INRAE, Philippe Augé, President of the University of Montpellier © INRAE, C. Maitre

#### **Contacts:**

[Com-Montpellier@inrae.fr](mailto:Com-Montpellier@inrae.fr) :

[presse@cirad.fr](mailto:presse@cirad.fr), [presse@inrae.fr](mailto:presse@inrae.fr), [presse@ird.fr](mailto:presse@ird.fr) [ghyslaine.besancon@supagro.fr](mailto:ghyslaine.besancon@supagro.fr)

#### **Scientists**

Claire Billot, Cirad ; Jean-Marie Prosper, INRAE ; Joëlle Ronfort, INRAE ; Jean-Louis Pham, IRD

#### **About**

---

##### **CIRAD**

CIRAD is the French agricultural research and international cooperation organization working for the sustainable development of tropical and Mediterranean regions. It works with its partners to build knowledge and solutions and invent resilient farming systems for a more sustainable, inclusive world. It mobilizes science, innovation and training in order to achieve the Sustainable Development Goals. Its expertise supports the entire range of stakeholders, from producers to public policymakers, to foster biodiversity protection, agroecological transitions, food system sustainability, health (of plants, animals and ecosystems), sustainable development of rural territories, and their resilience to climate change. CIRAD works in some fifty countries on every continent, thanks to the expertise of its 1650 staff members, including 1140 scientists, backed by a global network of some 200 partners. As such, it supports French scientific diplomacy operations. [www.cirad.fr](http://www.cirad.fr)

##### **INRAE**

Created on January 1, 2020, the French National Research Institute for Agriculture, Food, and Environment (INRAE) is a major player in research and innovation. INRAE carries out targeted research and resulted from the merger of INRA and IRSTEA. It is a community of 12,000 people with 268 research, experimental research, and support units located in 18 regional centres throughout France. Internationally, INRAE is among the top research organisations in the agricultural and food sciences,

plant and animal sciences, as well as in ecology and environmental science. It is the world's leading research organisation specialising in agriculture, food and the environment. INRAE's goal is to be a key player in the transitions necessary to address major global challenges.

Faced with a growing world population, climate change, resource scarcity, and declining biodiversity, the institute is developing solutions that involve multiperformance agriculture, high-quality food, and the sustainable management of resources and ecosystems. [www.inrae.fr/en/press](http://www.inrae.fr/en/press)

## **IRD**

The French National Research Institute for Sustainable Development (IRD-France) is an internationally recognised multidisciplinary organisation, working mainly in partnership with countries in the Mediterranean and intertropical zone. IRD sets its priorities in line with the Sustainable Development Goals (SDGs) adopted by the United Nations in September 2015, to steer development policies. Combining critical analysis into the implementation of these goals, IRD seeks to tackle the challenges facing us today: global, environmental, economic, social and cultural changes that affect the whole planet. <https://en.ird.fr/>

## **Institut Agro**

Institut Agro brings together three leading French agronomic academic institutions : Montpellier SupAgro, Agrocampus Ouest, and AgroSup Dijon, with the ambition to become the leading French tertiary educational institution in the domains of agriculture, food systems, and the environment. Institut Agro covers all agricultural value-chains including horticulture, viticulture, livestock and fish, spanning temperate, Mediterranean, and tropical agri-food systems, offering a breadth of degree and certification options from PhDs and master to undergraduate. Building on synergies between education, research and innovation in the domains of agro-ecology, food systems and digitalization, Institut Agro contributes to the transformation of agri-food systems in a climate crisis and to capacity development of value-chain and socio-ecosystems stakeholders. With a budget of €130 M, Institut Agro represents 4500 students (of which 2500 are masters' and 450 PhD), 1200 staff (of which 300 are teacher-researchers), 6 campuses, 39 joint research units with research institutions (notably INRAE and CIRAD) and 19 partnership chairs with enterprises and foundations.

More on <https://www.institut-agro.fr/fr>