France and IRRI

Within a few years of IRRI's founding in 1960, French scientists were already collaborating with the institute's researchers, albeit informally. Scientific collaboration between French institutions and IRRI has since continued in several key areas.

The Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD) and the Institut de Recherche pour le Développement (IRD), both French research centers, have been strong IRRI partners through the years. Since the late 1990s, CIRAD and IRD have sent French scientists to be seconded at IRRI as part of collaborative research initiatives that strengthened the linkage between agricultural research

Key achievements of recent supported work

- **Improved breeding.** Genetic factors that determine rice productivity and tolerance for water stress were studied, as a result of which researchers now have a clearer understanding of how rice can be grown amidst climate change. Support from the French government also enabled studies on the conservation and evaluation of genetic resources as well as on varietal improvement, resulting in enhanced knowledge of rice systems and of the process of domestication, allowing plant breeders to identify potential crosses of interest.

- **Protecting the rice crop.** Several projects sought to increase the optimum productivity of the rice crop through efficient nutrient management. These projects helped IRRI scientists advance methodologies that transformed site-specific nutrient management (SSNM) into easy-to-use decision tools and videos for use of extension workers, crop advisors, and farmers. A nutrient decision-support system, *Nutrient Manager for Rice,* was developed. These, along with other field-specific, integrated nutrient management approaches in intensive irrigated rice systems, were created and field-tested in South and Southeast Asia.

and development. Partnership with CIRAD was also instrumental in the development and implementation of the global rice phenotyping networks anchored on the Global Rice Science Partnership (GRiSP).

The French government has been a solid financial supporter of the institute over the years, donating more than USD 11 million between 1986 and 2014 in support of various research projects, as well as providing unrestricted support through CGIAR.

Since 1978, 36 French researchers—from doctorate students to participants in short courses—have undergone training at IRRI.

In addition to CIRAD and IRD, IRRI has also been collaborating with key French partners Institut National de la Recherche Agronomique (INRA), the Agropolis Fondation, and some entities from the private sector, such as AXA Research Fund, BRL Ingénierie, and ENERTIME. ■

Current France-IRRI collaborative research activities

- **AXA Chair on genome biology and evolutionary genomics.** The program seeks to unlock the genetic diversity of rice through large-scale genome sequencing and detailed phenotypic characterization. The enormous amount of data generated will provide a genetic diversity platform with predictive power on gene-phenotype relationships and plant performance. The platform will be essential in increasing precision and, thus, efficiency in rice improvement for many generations to come.

- **Genomic selection for resource-use efficiency in rice (GS-Ruse).** Funded by the Agropolis Fondation, the GS-Ruse project aims to provide rice breeders with tailored methods and tools for the integration of genomic selection approaches in their breeding strategies. The project includes phenotyping of TP-I and CP-I for drought tolerance. In parallel, precision phenotyping of the 300 TP-I accessions will be undertaken through the use of the rainout shelter at IRRI headquarters in the Philippines. This includes evaluation of the TP-I population for yield and yield-contributing traits under reproductive-stage drought stress and non-stress conditions, root traits, and water-use efficiency under drought stress. A PhD scholar is working with IRRI and CIRAD to develop models for the successful application of genomic selection under drought in rice.

- **Assessment tools for climate change impact on rice.** Climate change adaptation strategies, based on crop improvement through breeding, are developed. A crop modeling approach using present and future climate scenarios is also being implemented. Once appropriate crop models have been improved, calibrated, and validated, these will be used to measure the impact that climate change scenarios have on existing crop varieties. The crop models will also determine trait combinations that would improve adaptation and performance.

- **Review of the rice market in Southeast Asia (SEA) and assessment of risks and opportunities for food security in the region.** Although the SEA rice market is marred by government interventions, production losses from extreme weather, and volatile prices, several measures can be implemented to improve the functioning of the rice market and thus strengthen food security in the region. The project attempts to assess the SEA rice market and determine ways to ensure that the region is food-secure.

International Rice Research Institute (IRRI)

The International Rice Research Institute (IRRI) is the world's premier research organization dedicated to reducing poverty and hunger through rice science; improving the health and welfare of rice farmers and consumers; and protecting the rice-growing environment for future generations. IRRI is an independent, nonprofit research and educational institute founded in 1960 by the Ford and Rockefeller foundations, with support from the Philippine government. The institute, headquartered in Los Baños, Philippines, has offices in 15 rice-growing countries in Asia and Africa, and about 1,000 staff members.

Working with in-country partners, IRRI develops advanced rice varieties that yield more grain and better withstand pests and disease as well as flooding, drought, and other destructive effects of climate change. More than half of the rice area in Asia is planted to IRRI-bred varieties or their progenies. The institute develops new and improved methods and technologies that enable farmers to manage their farms profitably and sustainably, and recommends rice varieties and agricultural practices suitable to particular farm conditions as well as consumer preferences. IRRI assists national agricultural research and extension systems in formulating and implementing country rice sector strategies.

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Rice science for a better world