The International Rice Research Institute

The International Rice Research Institute (IRRI) is an autonomous, nonprofit agricultural research and training center whose purpose is to increase total food production from rice-based farming systems while protecting the environment and sustaining resources. Most of the IRRI’s research is done in cooperation with national agricultural research and development institutions, farming communities, research institutions, and other organizations that share the IRRI’s goals.

The IRRI was established in 1960 by the Ford and Rockefeller Foundations in cooperation with the government of the Philippines. Research activities began in 1962.

The institute’s research center includes laboratories and training facilities on a 252-hectare experimental farm on the campus of the University of the Philippines Los Baños (UPLB), about 60 kilometers south of Manila.

Why an International Research Center for Rice?
One in every three people in the world depends on rice as their staple food. 91% of the world's rice is grown and consumed in Asia, where more than half the world's people and about two thirds of the world's poor live. Rice is also an important staple in Latin America and Africa.

Ways to alleviate economic and environmental problems and at the same time increase productivity, are urgently needed. The IRRI was established to help farmers in developing countries grow more rice on limited land with less water, less labor, and less use of chemicals, and to do so without harming the environment. A major IRRI research thrust is the development of technologies that reduce farmers’ dependence on chemical pesticides and other purchased inputs.

Who works and studies at the IRRI?
The IRRI employs a large number of scientific and support staff members, 95% of whom are Filipinos. More than 60 international senior scientists have also been recruited. While most are assigned at the IRRI headquarters, other IRRI scientists are posted in Cambodia, India, Indonesia, Japan, Lao PDR, Madagascar, Myanmar, Nigeria, and Thailand. Half of the IRRI’s internationally recruited scientists are from developing countries.

The IRRI’s training program matches its strategic and ecosystems research foci by providing research facilities and training programs for Ph.D. candidates, postdoctoral researchers, and mid-career training opportunities for national rice scientists. Short-term group courses are also conducted at the IRRI.

Under the supervision and guidance of IRRI scientists, M.Sc. and Ph.D. research scholars, mostly from developing countries, learn traditional and new research approaches to address global rice production and utilization problems. Each year, about 200 group trainees learn new and updated rice research skills to address needs at the national level. Currently, about 8000 scientists trained at the IRRI, and 2700 others trained at the IRRI’s collaborative in-country courses, are members of the national rice research and development teams in Asia, Africa, and Latin America.

Who funds the IRRI?
The IRRI was the prototype for a world network of 16 nonprofit international agricultural, forestry, and fishery research centers supported by the Consultative Group on International Agricultural Research (CGIAR). The CGIAR, established in 1971, is a coordinating organization through which funds for international agricultural research are administered to various centers. Co-sponsors of the CGIAR are the Food and Agriculture Organization of the United Nations (FAO), the International Bank for Reconstruction and Development (World Bank), the United Nations Development Program (UNDP), and the United Nations Environment Program (UNEP). The CGIAR comprises donor countries, international and regional organizations, and private foundations. An independent Technical Advisory Committee of leading scientists from developed and developing countries monitors the scientific quality of research at the centers. The IRRI also receives financial support from countries, donor agencies, and foundations. Some of this support comes through the CGIAR, and some directly from individual donors.

Who sets the IRRI’s policies?
A Board of Trustees sets the IRRI’s policies. The board is composed of 15 members, who are world leaders in their respective disciplines. Three of them are ex-officio: the Philippine secretary of agriculture, the president of the University of the Philippines, and the IRRI director general. The board meets once a year to review the IRRI research priorities and allocation of resources and set the institute’s scientific directions, policies, and strategies. The director general is responsible for carrying out these policies.

What impact has the IRRI had on rice production?
The IRRI developed the first semidwarf breeding lines for rice in the mid-1960s, about the same time the International Center for Maize and Wheat Improvement (CIMMYT) developed the first semidwarf breeding lines for wheat. The high yields and rapid adoption by farmers of the new grain varieties triggered the Green Revolution. National agricultural programs worked in cooperation with the IRRI to intensify rice production. This was soon followed by dozens, then hundreds, of semidwarf varieties developed by scientists of various national programs. The IRRI rice germplasm served as genetic building blocks in the development of most of these varieties.

In order to ensure that traditional varieties will not be lost, IRRI has had from the very beginning a program of genetic conservation — multiplying and storing seeds of all known varieties for future use by rice scientists anywhere in the world.
The average rice yields in South and South-east Asia in 1992-1994 were 88% higher (three years right after the introduction of the first high-yielding variety) than in 1964-1966. Total production rose by 127%, while the farmland planted with rice increased by only 20%. The population of South and South-east Asia, however, grew by 87% from 1964-1966 to 1992-1994.

What are the IRRI's Challenges for the Future?

Rice surpluses and low prices in recent years have given many an impression that the world's food production problems are solved. However, population pressure in the rice-growing countries is intense: about 80-100 million additional people must be fed each year. Prime rice farmlands are under pressure.

Resource-poor farmers and the rural population in Asia, who do not own farmland, are being forced to till highly eroding and marginal lands, or to migrate to urban areas in search of a livelihood, often leading to even more poverty.

Asia accounts for 59% of the global population, and about 91% of the world's rice production and consumption. Rice provides 35-80% of the total calories consumed in Asia. Rice production has so far kept up with demand, despite a slowdown in the growth of total rice farmland. Bangladesh, China, India, Indonesia, Thailand, and Vietnam are the world's largest rice producers, accounting for about 79% in 1994.

From 1965-1967 to 1992-1994, total rice production doubled. 77% of this increase came from higher yields and increased cropping intensity, but 23% resulted from new land brought under cultivation, or the shift into rice cultivation from other crops. Much of the yield increase can be traced to the introduction of modern rice varieties, and to the increased use of fertilizer, irrigation water, and other inputs.

The world's annual paddy production, however, must increase by almost 65% over the next 31 years to keep up with population growth and increased demand for food due to higher incomes.

If predictions concerning population growth, climatic changes, and the accelerating erosion of agricultural bases hold true, the turn of the century will be characterized by decreasing areas available for rice farming. By the year 2025, rice yield has to increase to 8.0 tons per hectare in irrigated areas and to 3.8 tons in rain-fed areas to meet the growing demand. The yield at present is 5.0 and 1.9 tons per hectare, respectively. The IRRI and its partners in the rice world must also tackle the possible adverse effects of intensive rice cultivation on natural resources and the environment.

What are the IRRI's Programs?

At present, the IRRI's interdisciplinary research programs focus on four major rice ecosystems: irrigated, rain-fed, low-land, high-land, and flood-prone. Another on-going research program is the cross-ecosystems research program, which focuses on research that will generate information applicable to all or some of the programs.

Current Research Projects

Some of the IRRI's projects under the various ecosystems are listed below.

Irrigated rice ecosystem
* Raising the yield plateau
* Reversing trends of declining productivity
* Improving nutrient management
* Identifying tillage and water interactions
* Developing post-harvest technology
* Improving pest management
* Examining global climatic changes
* Improving rice-wheat systems

Rain-fed low-land rice ecosystem
* Characterizing and analyzing the environment
* Resource management for enhanced productivity
* Germplasm improvement

High-land rice ecosystem
* Germplasm improvement
  — developing tolerance to drought,
  — weed, nematodes, and blast
  — developing allelopathic rice
  — developing perennial rice
* Productivity and sustainability of high-land rice-based farming systems

Flood-prone rice ecosystem
* Germplasm improvement
* Crop and resource management to improve productivity

Cross-ecosystems research
* Assessing the potential of rice germplasm
* Biotechnology tools for rice breeding
* Exploiting biodiversity for sustainable pest management
* Systems approaches to quantify rice ecosystem performance
* Agroecological characterization, technology impact, gender, and policy analysis
* Assessing opportunities for nitrogen fixation in rice

Besides this, the IRRI's international services programs include germplasm conservation, dissemination and evaluation of information; information and knowledge exchange; training; and strengthening international partnerships—with an aim to strengthen rice research of national systems and to improve the institute’s services to the international rice research community.

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