

IRRI

# Annual Report 2013



Rice science for a better world

# Director General's message

## IRRI is here for the long haul, so visioning for 2035 begins

As we look to the future, there's no question that IRRI is going to be around for the long haul. I do not envision a world in which there is not an IRRI. However, the world is changing dramatically and the Institute will have to adapt. The whole array of partners that we should be working with is shifting. Rice itself used to be of little interest to the private sector—that's not the case anymore. Indeed, the economic winds of change are blowing in ways we never contemplated.

The global environment of agriculture and food is transforming drastically right before our eyes. Woe unto us if we do not pay attention! As strong demand for rice continues, climate change is going to be a challenge for most of the planet's rice-growing areas. In facing our complicated future, we will need a better infrastructure. In 2013, we made significant investments in infrastructure as well as human resources, communication, and the One Corporate System with our CGIAR center partners. But this is only the tip of that proverbial iceberg.

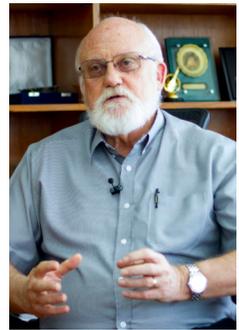
With the idea to start a visioning exercise towards 2035, IRRI's BOT asked that we take a look at where the world is going and what the Institute might be like in that world. Over several months, BOT members, the IRRI Management Committee, and selected consultants got together for some thought-provoking discussions with experts across the globe.



The results were not surprising. In the future, IRRI must be a flexible, vibrant, agile, independent, and well-focused institution. And we must be able to respond—rapidly! Nothing frustrates me more than when we don't react quickly to an opportunity or a challenge. We'll have to target our work carefully. It will be very, very important to have strategic partnerships with the best institutions around the world. They will need to be with us for the long haul. Certainly, if the CGIAR research design and funding model moves to a 3-year project cycle as proposed, this will be inadequate for the challenges and opportunities that face us in our work to overcome deep-seated food insecurity and poverty.

It is clear that we must maintain our strong persona, our integrated approach, our high-quality science, and our outstanding partnerships. But, of course, we should continue to ask hard questions about our focus. We must be guided by a clear plan—an exciting rice plan that uses tools beyond our predecessors' imaginations. Into 2014, our strategic planning continues. Stay tuned.

In addition to the ongoing visioning exercise, it is amazing and gratifying to see what else the IRRI staff accomplished in 2013. This brochure provides a quick glimpse into our research achievements and milestones. As I'm sure this condensed account will tempt you to find out more, go to [www.irri.org/AnnualReport/2013](http://www.irri.org/AnnualReport/2013) for all the thrilling details.



  
Robert S. Zeigler  
Director General

# Milestones



## 2013 was packed with significant events, activities, and media coverage

- In January, professionals from different companies and nonprofit organizations participating in the *30th Global Young Leaders Program* presented their recommendations on how to commercialize research outputs, such as IRRI's Nutrient Manager for Rice.
- During the first half of the year, 20 IRRI scientists and scholars gathered in the fields of the IRRI Experiment Station to take up the 6-month-long *Rice Survivor* challenge, enabling them to experience growing rice the way farmers do.
- On 14 February, Philippine President Benigno Aquino III visited IRRI to mark the *National Year of Rice*.
- As part of Ambassadors' Day on 3 May, an 8-month-long photo exhibit, *Feathers in the Fields: The Birds of IRRI* opened at the Riceworld Museum, which showcased the many bird species that frequent IRRI's environmentally friendly rice fields.
- To help unleash the great potential of promising students in Asia to help feed the region into the future, a US\$3-million donation in June established the Lee Foundation Rice Scholarship Program to educate and train a new generation of rice scientists.
- Throughout July, IRRI joined the 39th celebration of the *National Nutrition Month* in the Philippines with the theme, *Together we can end poverty and malnutrition*.
- In August, IRRI built on decades of gender research to host *Women in Rice Farming Day* to recognize the role of women in agriculture.
- In September, Myanmar's Ministry of Agriculture and Irrigation, with the support of IRRI, held a conference and workshop in Nay Pyi Taw to develop the Myanmar Rice Sector Development Strategy. Later, in December, Myanmar President U Thein Sein visited IRRI headquarters to renew and reaffirm his country's partnership with the Institute.
- On 5-8 November, IRRI hosted the *7th International Rice Genetics Symposium (RG7)*, which brought more than 700 top researchers in the field of genetics and related disciplines to Manila.
- Throughout the year, IRRI signed various memoranda of agreement with governments and private companies, including ones on scientific and technical collaboration with the Pakistan Agricultural Research Council, Burundi, and Iran, and others promoting and disseminating improved rice research technologies with India's Coromandel International Limited and Tanzania Seed Company Ltd.



For more milestones and links go to <http://irri.org/AnnualReport/2013>; For milestones across 54 years of IRRI's rich history, go to <http://irri.org/about-us/our-history>

# Research highlights



## Beating a formidable nemesis

Bacterial blight (photo) is one of the oldest diseases of rice. It is a most serious rice disease in South and Southeast Asia, and has recently been reported in Africa. In susceptible rice varieties, bacterial blight can cause yield losses of 70% or higher. Over the years, some headway against this scourge has been made, but with an ever-evolving pathogen and changing climate, researchers continue to look for ways to improve defenses against bacterial blight. IRRI scientists are using a critical mix of resistant rice genes and mapping the bacterial blight genome to help defeat the disease.



## “Nine endangered dragons”

The Mekong Delta in Vietnam comprises nine river mouths known as Cuu Long or “nine dragons,” enabling the country to produce around 20 million tons of rice every year. But now, the delta is threatened by climate change. Erratic rainfall and rising sea levels are conspiring to set off a chain reaction that could reduce the productivity of rice farms in the region. The Climate Change Affecting Land Use in the Mekong Delta: Adaptation of Rice Cropping Systems (CLUES) project aims to deliver newer varieties and smarter technologies to help farmers here cope with the changing climate.

## The multimillion dollar science payoff

A US\$12-million investment in rice research made by the Swiss Agency for Development and Cooperation over 16 years returned \$70 million in benefits to rice farmers and national economies. The assessment of a selection of natural resource management technologies rolled out by IRRI as part of the Irrigated Rice Research Consortium increased the productivity of rice farmers, improved livelihoods and food security, and bolstered social cohesion. The projected benefits could reach 25 times the initial investment by 2016.

## GRiSP on target

In 2013, the Global Rice Science Partnership (GRiSP), the CGIAR Research Program on Rice led by IRRI, marked the halfway point of its first phase with significant achievements. For example, the GRiSP-initiated Global Rice Phenotyping Network (GRPN) is bringing together an international community of rice scientists to build a database where breeders can pick the genes for the crop trait they need. To breeders, a grain of rice is one of the world’s largest libraries—a repository of genetic information about the crop that provides food for several

billion people. Enter the GRPN, which will contribute to massive gene discovery, with each network partner bringing in its own research expertise and facilities.

On other fronts, significant impacts coming from the adoption of GRiSP technologies are occurring. For example, farmers in Odisha State, India, who adopted the flood-tolerant Swarna-Sub1 variety, are obtaining an average yield benefit of 232 kg/ha (11%), with a maximum of 718 kg/ha (66%) when floods last up to 13 days. Swarna-Sub1 is especially advantageous to lower-caste farmers as they occupy more of the lower-lying flood-prone areas and their plots undergo flooding that last 21% longer (compared with farmers belonging to higher castes).

### Science to the rescue

Cyclone Mahasen brought widespread flooding to Bangladesh in May. In response, IRRI, through the Stress-Tolerant Rice for Africa and South Asia project, donated 10,000 seed minikits (2.5 kilograms each) of high-yielding, flood-tolerant rice varieties developed by the Institute to farmers in flood-affected areas so that they will be able to sow during the succeeding cropping season. These efforts follow on the heels of IRRI making tons of flood-tolerant rice available to farmers in Assam after the serious flooding in 2012.

In the Philippines, IRRI promptly provided the government with satellite-generated maps of rice areas affected by Typhoon Haiyan. Haiyan was the strongest storm ever recorded at landfall and caused catastrophic destruction in the central Visayas region in November. The maps accurately showed the extent of damage—a vital information for preparing timely rehabilitation interventions.



**IRRI, in cooperation with the Philippine Department of Agriculture, donated three seed batches totalling 13 tons of high-yielding rice varieties. The seeds are being multiplied for farmers in areas devastated by Typhoon Haiyan.**



### **Burundi: Africa's newest rice research capital**

IRRI opened its East and Southern Africa regional office in Burundi to help boost rice production (photo) and improve food security in the region where most countries depend on rice imports to meet their growing domestic consumption. The Burundi government provided 10 hectares of land for IRRI's operations, which will support the development and testing of new rice varieties suitable for the region.

### **Food security from outer space**

The Remote sensing-based Information and Insurance for Crops in Emerging economies (RIICE) project is using space-age technology to provide timely and accurate information on rice growth areas and expected yields. The project is helping governments, agricultural intermediaries, and relief organizations improve the management of domestic rice production and distribution during normal growing cycles as well as in the aftermath of natural catastrophes.

### **Wonder rice for when the rains stop**

Thousands of smallholder farmers in small villages in South Asia have become increasingly used to seeing their rice crops decimated by searing drought. But the development of Sahbhagi dhan, a drought-tolerant rice variety, has brought hope back as farmers report higher yields in spite of moderate to severe dry spells. Through the Stress-Tolerant Rice for Africa and South Asia project, coordinated in South Asia by IRRI, even more farmers are receiving the seeds of this rice variety that has earned the nickname "Wonder Rice."

# Research highlights (continued)

## New rice, high hopes

IRRI and its partners released 44 new and improved rice varieties for Asia and Africa. Varieties suitable for areas prone to flooding and soil salinity were deployed in Bangladesh, Cambodia, India, Indonesia, Myanmar, the Philippines, and Vietnam. In collaboration with the Africa Rice Center, IRRI also released new rice varieties for Mozambique, Nigeria, Rwanda, and Tanzania. These were developed to thrive under drought conditions and in soils with high levels of iron. The 2013 batch brings the total number of IRRI-developed rice varieties to just under a thousand.

## Quenching the thirst of Bangladesh

Bangladesh is one of the most water-abundant countries in the world but millions of farmers living in the country's southwestern coastal zone are chained to perpetual poverty by the lack of sufficient irrigation. Improved crop and water management could keep the region's productivity potential afloat and help the farmers cope with the enormous pressures of climate change.

## "SPIKE" gene discovery to promote higher rice yields

Japanese and IRRI scientists have discovered a rice gene that in preliminary testing increased production by 13–36% in modern long-grain indica rice varieties. Indica is the world's most widely grown type of rice. They found the gene, aptly named *SPIKE*, in an Indonesian tropical japonica rice variety. Japonica rice is grown mainly in East Asia and accounts for only about 10% of global rice production. This breakthrough means that breeders can now start incorporating the *SPIKE* gene into popular indica rice varieties, which will then display an improved plant architecture that promotes higher yield potential without altering the desirable grain quality or growth periods already present.



Tsutomu Ishimaru, rice breeder for IRRI and the Japan International Research Center for Agricultural Sciences (JIRCAS), inspects a rice plant with the *SPIKE* gene. He is leading the work to develop new varieties with the gene.

# Scientific publishing: a valued IRRI tradition



Publishing in prominent peer-reviewed scientific journals is a major means of showcasing the important work of IRRI scientists and their partners. More than 1,030 articles have been published over the last 6 years. In 2013, 190 articles covering numerous disciplines appeared across a wide array of cutting-edge journals led by *Field Crops Research* (19 articles), followed by *PLOS One* (8), *Molecular Breeding* (6), and *Phytopathology* (6). See the complete list online.

Among the new titles in 2013 joining the Institute's stable of published works was the fourth edition of the *Rice Almanac*, the first IRRI book available for viewing on Kindle. This edition provides global coverage of issues related to rice production, from the environment to economics, and features the profiles of 81 rice-producing countries.

Since December 2007, when IRRI went into partnership with Google Book Search to provide free full-text versions of its archived scientific books, around 450 titles have generated more than 2.4 million book visits, including approximately 23 million page views and more than 160,000 full-book downloads.

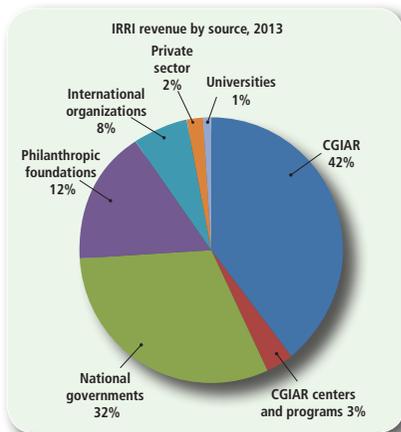


# Financial support



IRRI's total revenue for 2013 was US\$93.52 million, including \$12.30 million that was invested in Africa Rice Center (AfricaRice) and the International Center for Tropical Agriculture (CIAT) to carry out Global Rice Science Partnership (GRISP) activities.

Donor investment is fundamental to achieving our goals and, in 2013, major donor groups included CGIAR (\$39.23 million), CGIAR centers and programs (\$2.74 million), national governments (\$30.18 million), philanthropic foundations (\$11.34 million), international organizations (\$7.15 million), the private sector (\$1.64 million), and universities (\$0.58 million). For detailed information, refer to IRRI's audited financial statements at <http://irri.org/AnnualReport/2013>.



# Human resources: our dynamic asset



**O**ur goal is to recruit and retain dynamic people that possess the competencies and skills required for IRRI to implement its research strategy.

We are committed to the development and wellbeing of our national and international staff, who now exceed 1,300 in number worldwide. We have more than 1,200 nationally recruited staff in 16 different locations in Asia and Africa. Our globally recruited staff has more than doubled in size since 2005, and now numbers close to 150.

IRRI's workplace thrives with diversity, with more than 36 countries represented on the staff. We are particularly proud to be an employer that values gender equality: 37% of all our staff worldwide, 57% of all headquarters-based nationally recruited scientists, and 33% in senior management being women.

In 2013, we made several significant changes to our structure to further maximize the efficiency and professional interaction of our staff. Human Resources Services conducted modernization activities that included the introduction of new career paths, the development and launch of a new Code of Conduct, the adoption of a more efficient way to access knowledge and skills on service agreements, and a continued consultative workplace relations program.

While IRRI continues to provide a wide range of learning and development opportunities, we have not neglected the work-life balance. The Institute continues to provide its staff with family-friendly social and wellness activities throughout the year.



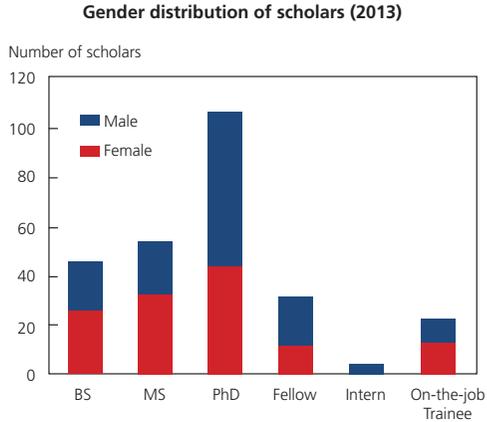
# Training the next generation



**D**eveloping the capabilities of the next generation of scientists through training has always been an essential backbone of IRRI's programs. A strong network of professionals is crucial in achieving sustained increases in rice production and continuous delivery of updated technologies to farmers to improve their productivity.

In 2013, IRRI headquarters hosted 266 scholars from 33 countries. Short training courses and workshops for farmers, technicians, and others conducted across the globe were attended by 91,561 persons (see course and country breakdown online). Significant training activities for 2013 include:

- The first *Rice Production Training Course*, conducted by IRRI and the Regional Rice Research and Training Center for West-Central Asia in Rasht, Iran in June, attended by technologists from Afghanistan, Azerbaijan, Iran, Iraq, Kazakhstan, Kyrgyzstan, Tajikistan, and Turkey.
- The JICA-sponsored *Season-long Rice Farming Training for Extension Agronomists*, on its third year, had participants from Cameroon, the



Gambia, Liberia, Zambia, and the Philippines.

- A course on rice production techniques for research technicians of the Coalition for African Rice Development-member countries provided researchers and technicians with the latest knowledge and enhancement of skills in farm management.
- Global food manufacturer MARS, Inc. participated in a training workshop on rice mechanization and production. Delegates underwent basic training in rice production principles and practices.

**On the cover:** Head breeder Eero Nissilä, GM research leader Inez Slamet-Loedin, and their teams are combining conventional and novel breeding strategies to get new rice varieties through the pipeline faster.



IRRI is a member  
of the CGIAR  
Consortium

[www.irri.org/AnnualReport/2013](http://www.irri.org/AnnualReport/2013)

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