



# Leading innovations

Annual Report 2016

IRRI

# Our mission

IRRI aims to reduce poverty and hunger, improve the health of rice farmers and consumers, and ensure environmental sustainability of rice farming. We do these through collaborative research, partnerships, and the strengthening of the national agricultural research and extension systems, or NARES, of the countries we work in.

## **On the covers:**

**Front:** Mechanization in the rural areas to increase productivity is a key driver for change in the rice sector.

Photo by Lanie C. Reyes

**Back:** Women farmers work on rice stalks discharged by a thresher in the Philippines.

Photo by Elmer Nev. Valenzuela (copyright)

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# Transition and Change

*My first full year as Director General of IRRI has been a time of transition and the implementation of a change agenda to position IRRI as a vibrant and dynamic leader in the research for development sphere.*

We have been fortunate to welcome a series of new faces to our organization. Most notably has been the arrival in March 2016 of Dr. Jacqueline Hughes as Deputy Director General for Research. Dr. Hughes brings to IRRI a wealth of experience in leadership in research for development in Africa and Asia, along with personal expertise in plant pathology. Among our many other new team members, each of them is bringing an impressive skill set and capacities to drive IRRI's programs forward as well as new energy and ideas from which I know IRRI will benefit!

Our steadfast roles as a steward of the world's largest collection of rice genetic resources, a catalyst for food and agriculture innovation, capacity generator to national programs, and as a global clearinghouse for reliable and readily available information on the rice sector has never been clearer. However, we are not an organization to rest on our laurels. IRRI is constantly reviewing its direction and priorities

and rejuvenating our programs. In late 2016, we completed the planning phase for IRRI Education. Benefitting from the legacy of the IRRI Training Centre, IRRI Education will provide a customer-focused and demand-driven suite of educational programs that capitalize on IRRI's expertise in rice research, agriculture extension, and rice sector policy.

Supporting our research agenda, we opened our new state-of-the-art Genetic Resources Seed Processing Laboratory. The facility will increase the capacity and speed at which seeds are prepared for entry into the International Rice Genebank for more efficient use by all of our partners.

While our institutional focus at IRRI is on delivering impact, our underlying science must be excellent and I am delighted our scientific publication record continued to be strong, particularly in high-impact journals such as Nature's Scientific Reports, Plant Physiology, and Nature Genetics. This year resulted

in a bumper harvest of rice research publications and presentations by IRRI scientists involving around 235 journal articles, as well as a host of seminars, reports, and books and book chapters.

IRRI also continued to be a trusted brand among our country donors and partners. We advanced several key relationships with celebrations and milestones such as the visit of the Emperor and Empress of Japan, the signing of new Host Country Agreements with Cambodia and Tanzania, the signing of a new Memorandum of Understanding with the Chinese Academy of Agricultural Sciences and capacity-building activities with Indonesia, South Korea, and Vietnam.

At the same time, we successfully developed and secured support for the new RICE CGIAR Research Program (CRP). Equipped with a new name, the second phase of the CRP will build on the celebrated accomplishments of the Global Rice Science Partnership (GRiSP)—phase one of the RICE CRP. In the first phase, which ran from 2011 to 2016, GRiSP successfully continued germplasm development, production systems research, and socio-economic analysis. It also added a sharper focus on prioritizing research against fore sighting, the measurement of technology adoption and its impact, and the formation of globally


connected teams to speed the development and deployment of solutions for target beneficiaries.

The CRPs have been the most tangible and successful result of the CGIAR reform process, bringing together Centers and partners to address common goals, bringing to "research for development" the critical mass and scale to tackle the big challenges confronting the world.

In July 2016, the CGIAR's Constitution was amended and replaced with the Charter of the CGIAR System Organization in a significant reform process. The CGIAR System Organization and the CGIAR System Council provide governance to the CGIAR System and assume responsibilities of the former Fund Council and Consortium Board. IRRI supports this restructuring and will continue to work with CGIAR in advancing agri-food science and innovation to promote the economic productivity, equality, and nutritional status of poor people in the face of climate change and other challenges.

In January and again in March, I met with the Director General of AfricaRice, Harold Roy-Macauley, and the Director General of the International Center for Tropical Agriculture (CIAT), Ruben Echeverría, at Los Baños and then at CIAT headquarters in Palmira, Colombia. We had a great opportunity at





each site to learn in detail from rice researchers about the current issues related to climate research in each of the regions in which we work. I'm confident that IRRI and our two CGIAR sister centers will continue to work together across our common agenda and particularly around the mitigation and adaptation to climate change as it pertains to the rice sector.

Finally, in 2016, we took advantage of a number of opportunities to engage with partners and stakeholders to advance key conversations about the future of the global rice sector.

In August, during the 7th International Crop Science Congress (ICSC) in Beijing, we had a great opportunity to speak with researchers, policy advisors, and representatives from numerous

agriculture ministries about the importance of helping farmers reduce their susceptibility to climate change-related risks—whether that means providing them with high-quality climate-smart rice varieties or helping them move away from subsistence farming through better access to markets in order to raise their resiliency.

In November, we celebrated the 50th anniversary of the release of IR8 (the rice variety that jumpstarted the Green Revolution), with functions in India, where we were joined by World Food Prize winners Gurdev Khush and M.S. Swaminathan; and in the Philippines, where pioneer breeder Peter Jennings, Agriculture Secretary Manny Piñol, and more than 300 farmers travelled to Los Baños to see our work up close. While we toasted the past, it was also an opportune time to project forward and consider the future needs of the global rice sector and the role IRRI and

its many partners could play in that future.

Amid all of our accomplishments, most importantly, we have maintained our momentum through difficult times in some of the societies in which we work. This was particularly the case in Burundi and Bangladesh in 2016. I want to pay homage to our passionate and fiercely committed staff members who have always found ways to prevail, even when there is uncertainty, instability, and troubling events, even danger, on their doorstep.

As we look to 2017, there are exciting possibilities ahead. We will be upgrading key facilities and support functions in Los Baños and in-country sites. We will be continuing the evolution of our research agenda in 16 countries across the rice-producing world in order to meet the needs of the next decade, all within the framework of a new Strategic Plan to be rolled out in the first half of 2017.

*Matthew Morell*

Matthew Morell  
Director General

# Celebrating the miracle rice that saved Asia from famine

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On 29 November 2016, farmers, scientists, research and funding partners, and members of the diplomatic community gathered at the IRRI headquarters to celebrate the 50th year of IR8's world debut. IR8, the world's first modern rice variety, was developed by scientists at IRRI in the early 1960s. The variety was first introduced in the Philippines and India in 1966 marking the beginning of the Green Revolution in rice. Popularly known as the "miracle rice," it is believed to have saved many regions of Asia from famine.

But IR8 made its greatest impact in India. In 1961, India was on the brink of a massive famine. With the widespread adoption of IR8,

India's average rice output tripled to 6 tons per hectare by the mid-1990s. India has always been at the forefront of the Green Revolution. Once dependent on foreign food aid, India became a successful rice producer and is now the world's leading rice exporter. The Indian Council of Agricultural Research and IRRI celebrated the golden anniversary of the world's first high-yielding rice variety.

The celebration of the 50th anniversary of rice variety IR8 was also very timely for the International Center for Tropical Agriculture (CIAT) and its partners in Latin America. The variety's release impacted the evolution of rice breeding programs, the development of rice varieties that have been released since then, and agronomic crop management in the region.

*"When people talk about IR8, my mind tends to go back to the very beginning of IRRI. IRRI started with the audacious objective of improving rice yield and the wellbeing of farmers. It had a very small number of staff, but all very brilliant and excellent in what they did. That team came up with IR8, which laid the foundation for what had become a world-class institution."*

*Dr. Peter Jennings*

*IRRI's first rice breeder and a member of the team that developed IR8*



Rice that  
Changed the  
World:

Celebrating  
50 years



IRRI

# Cambodia and IRRI commemorate a 30-year partnership built on rice

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The Royal Government of Cambodia and IRRI celebrated 30 years of working together to secure the country's food and grow its rice sector. As part of the celebration, IRRI Director General Matthew Morell and Cambodian Secretary of State of the Ministry of Foreign Affairs and International Cooperation H.E. Ouch Borith signed an agreement to further intensify the growth of the country's rice sector through scientific research and training.

Morell said he looks forward to a stronger partnership as Cambodia's rice sector continues to grow in the midst of enormous challenges

such as climate change, continuing population growth, and dwindling natural resources.

Collaboration between the two parties was formalized in 1986, but IRRI's work to support the country's rice production started much earlier. In the early 1970s, IRRI staff collected samples of various rice types across Cambodia.

Duplicates of the samples were deposited in the International Rice Genebank at IRRI for safekeeping. These were later repatriated in the 1980s and enabled Cambodian farmers—who lost their rice seeds during the strife that gripped the country in the 1970s—to till their lands and grow rice again.

*"The Ministry of Agriculture, Forestry, and Fisheries and IRRI have had a productive partnership for the last 30 years, enabling Cambodia to produce enough rice to satisfy local demand and also become an exporter."*

*H.E. Yim Chhay Ly  
Cambodian Deputy Prime Minister*







## CHANGE THROUGH EMPOWERMENT

## The seeds of the future

**Although women's contributions to Myanmar's agriculture are limited by gender-based barriers, they are increasingly being tapped as producers of rice seed.**

In 2014, in Htan Ta Bin Township, Yangon Region, the Stress-Tolerant Rice in Vulnerable Environments (STRIVE) project engaged women in seed production because of the country's very limited rice seed growers. Today, these women rice farmers are becoming a very important part in attaining food security.

"We provided them with the high-quality seed of stress-tolerant rice varieties and 7-8 days of seed production training on their farm," explained Dr. Madonna Casimero, IRRI scientist and project leader. "Now we have at least five

successful women rice farmers who earn twice as much income by selling high-quality rice seed compared to selling the harvest as grain. Having the skills to produce quality seed and being able to sell helped these women farmers earn a better income."

The STRIVE project is supported by the U.S. Agency for International Development.

*"Having the skills to produce quality seed and being able to sell helped these women farmers earn a better income."*

*Dr. Madonna Casimero  
STRIVE Project Leader*









# Powerful agents of change

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**An inspiring grassroots gender revolution is taking place in Bihar, India. Women are establishing their identity as efficient and knowledgeable rice farmers in their community working in self-help groups (SHGs), thus increasing the scope of inclusion and equity in India's society.**

Through these groups, the interventions of the IRRI-implemented Cereal Systems Initiative for South Asia (CSISA) led to nearly 4,500 women farmers adopting new climate-resilient and sustainable agricultural practices and technologies. These village-level organizations bring women together to support one another and have access to microcredit and other services. These efforts have proven to be highly effective in empowering women to transform agricultural production in their community.

These highly encouraging developments are just the start as women farmers continue to face other challenges.

"There is a need to design strategies to bring the market closer to them and further explore the use of information and communication technology," said Ms. Sugandha Munshi, a gender

specialist at IRRI. "Self-help groups need more capital to become viable. Women-friendly financial services and products need to be developed."

*CSISA's focused interventions have led to nearly 4,500 women farmers adopting new climate-resilient and sustainable agricultural practices and technologies.*









## The need for speed (and seed)

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The International Rice Genebank collection continues to grow in size and usage. Over the last 5 years, more than 181,000 seed samples were shipped to 65 countries. The Genetic Resources Seed Processing Laboratory will make it possible to handle the growing volume of seeds submitted for safekeeping without compromising seed quality, handling standards, and end-user

requirements. It will also speed up the handling of requests for scientific research and breeding purposes from all over the world. The seed facility, built with support from the Federal Ministry for Economic Cooperation and Development (BMZ) of the Government of Germany, opened on 13 April 2016.

“For Germany, food security is a basic human right, and we all are responsible. We cannot close our eyes. We have to work for it,” said H.E. Thomas Ossowski, ambassador of Germany to the Philippines. “It is a gigantic task that needs to be undertaken, which demands international effort. I can assure you that Germany will always be a partner for that.”

*The Genetic Resources Seed Processing Laboratory provides a modern infrastructure and upgrades critical to the seed processing function of the International Rice Genebank. The genebank holds the germplasm of more than 127,000 rice varieties from around the world for conservation, scientific research, and breeding purposes.*





# Change is coming to Philippine agriculture

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In recent years, the Philippines has transformed from being a beneficiary country to a leading donor and partner of IRRI. In 2016, the Philippine Department of Agriculture and IRRI conducted seven major projects with the shared goals of reducing poverty and hunger, improving farmer and consumer health, and ensuring environmental sustainability. These initiatives range from conserving traditional rice varieties to using satellite technology to monitor the country's rice production.

In July 2016, Emmanuel Piñol, the new secretary of the Agriculture Department, said the administration of Philippine President Rodrigo Duterte will continue to exert all efforts and use all resources for the country to attain food security. Part of Secretary Piñol's strategy includes the rapid and effective transfer of technologies to farmers, easy credit schemes for farmers, and efficient marketing of farm products. He stressed that it would be the farmers themselves who will decide what they need to improve their production.

During his visit to the institute, the Secretary was keen on bringing advances in rice production developed through IRRI's research to the farmers. "I can assure our partners in IRRI that your work will not go to waste," said Secretary Piñol during his visit to the institute. "I would like to make sure that each advancement in technology would be translated into a better life for the Filipino farmer."

*"Technologies are useless unless they are in the hands of farmers."*

*Emmanuel Piñol  
Secretary  
Philippine Department of Agriculture*





# Helping Indonesia keep its rice bowl full

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Indonesia is the world's fourth most populous country and one of the largest rice consumers. To continue feeding its people, the country must increase its present rice production of 75 million tons by 2.3% every year through 2019. The country has always depended on Java—where nearly 60% of the total rice production comes from—to fill the country's rice bowls.

With a population of 135 million, Java is the world's most populous island on earth and rice production areas on the island are under pressure from urban and industrial development. In response, Indonesia crafted a long-term strategy for rice self-sufficiency by intensifying rice production on the outer islands, including South Sumatra. The island's potential rice-growing area, about 260,000 hectares, is situated in the coastal plain and deltas. However,

productivity is low because most farmers plant rice only once a year.


IRRI and the Assessment Institute of Agricultural Technologies (AIAT), through the *Closing rice yield gaps with reduced environmental footprints* (CORIGAP) project, introduced best rice-farming management practices in South Sumatra to help farmers sustainably intensify their rice production. In 2012, dry-season rice was planted on only 30 hectares. By 2014, farmers in the tidal deltas increased their rice production as double cropping expanded to 300 hectares. These encouraged more farmers to increase their cropping intensity. The planting area for rice in the dry season expanded impressively to 93,000 hectares in 2016.

The training on good rice cultivation practices enabled Pak

Subarjo, a farmer for 35 years in South Sumatra, to grow two crops in one year, producing more than 7 tons per hectare in the wet season and 4 tons per hectare in the dry season.

"The rapid increase in planting area was a combination of innovative extension strategies of AIAT and the promotion of CORIGAP nationally and provincially," said Dr. Harmanto, former AIAT director. The strong progress of the CORIGAP approach in South Sumatra can be traced to farmer-participatory field trials, its alignment with Indonesia's national policy for food security, and the innovative approaches in disseminating the crop management recommendations.

CORIGAP is funded by the Swiss Agency for Development and Cooperation.



*"I used to harvest only 2–3 tons of rice per year, and was able to plant only during the wet season. Now, I feel confident about planting rice thrice a year."*

*Pak Subarjo, South Sumatran rice farmer*



## PADI INPARI 22

Pupuk NPK	7,5 ton/ha OAG
Pada-pada hasil	5,8 ton/ha OAG
Uraian Karet	118 hari setelah tanam
Kapasitas Karet	21,80 % (pemerik)
Sifat Karet	Agak tahan WSK, biotipe 1,2,3
	Tahan ACB Palsatop II, resisten IV dan VII
	Tahan BMR 100 033 dan 133
	Agak tahan rta 073 dan 137
	Kertan (LUNGSI)
	21 September 2018



# Seeding with a sense of urgency

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Rice breeding technology has evolved since the development of IR8, the first modern rice variety, 50 years ago. In fact, to the pioneers of that era, the standard tools available to plant breeders today would look like science fiction technologies. Molecular breeding and genomics have made it possible to quicken the pace of the development of rice varieties.

Yet, in eastern India, the average age of rice varieties in farmers' fields is 28 years! Because the world has drastically changed, particularly the climate patterns on which most farmers rely on, eastern India's rice system suffers from low production, productivity, and farm incomes. It could take between 3 to 6 years from initial evaluation of a breeding line to the release of a new rice variety. The inability of the seed industry to supply the farmers with high-quality seeds of the latest rice varieties and weak extension

services add to the slow rate of varietal adoption by farmers.

All that is changing with the help of the Stress-Tolerant Rice for Africa and South Asia (STRASA) project, a 10-year initiative with a vision to deliver improved varieties to at least 18 million farmers on the two continents. STRASA, which entered its third phase in 2016, has accelerated the delivery of climate-smart rice and has significantly reduced the gap between rice laboratories and rice fields.

The project's dissemination team uses groundbreaking approaches to speed up the delivery of its products not only within countries but across political boundaries through "rice diplomacy" to help the region achieve shared goals in food security and poverty alleviation.

"How we move varieties from one country to be released in another

without further testing has not happened in the world before," said Abdelbagi Ismail, STRASA's overall project leader and a scientist at IRRI. "This variety sharing is now a reality in South Asia."

Dr. Gurbachan Singh, chairman, Agricultural Scientists Recruitment Board in India, underscored the many activities that IRRI and India's national agricultural research systems have achieved and continue to work on in bringing stress-tolerant varieties to farmers and in helping solve complex climate change-related problems affecting farmers.

"STRASA has contributed significantly to boosting rice production while providing opportunities for all its participants and stakeholders to make better choices," Dr. Singh said.

STRASA is funded by the Bill & Melinda Gates Foundation.



*"STRASA's dissemination team is using pioneering approaches to speed up the delivery of its products. We are very proud to be supporting this project."*

*Dr. Gary Atlin  
BMGF*





## Building a community on water

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The coastal areas of Bangladesh have more than one million hectares enclosed by polders to control tidal flooding. The polder zones are highly susceptible to climate change-related problems such as rising sea level and flooding. These put farmers in polder areas at a disadvantage because they can only plant a single crop of traditional rice each year. Thus, poverty is common in these areas.

The problem is not the absence of modern high-yielding rice varieties. There are several varieties adapted to the conditions of the polder zones. Early-maturing rice varieties enable the farmers to plant more than two crops per year. The problem lies in water governance—or the lack of it—in timing the opening and

closing of sluice gates, which requires the involvement of the community. This is where the water management group comes into play.


“Farmers can come together to talk about when to open or close the sluice gates,” said Manoranjan Mondal, an IRRI water management expert based in Bangladesh. “They need to agree when to plant their crops and what kind of variety to plant. If some cultivate early-maturing rice but others do not, then those who harvest earlier will have to wait for other farmers to harvest their late-maturing traditional crop before they can plant another crop.”

One example is the Fultala Water Management Group. Registered in 2014, the Fultala WMG covers

146 hectares and 262 households. It has 152 members, 85 of which are women. With a growing cash capital of BDT 61,000 or around USD 700, they already own some farm machines, including a power tiller, a power pump, and a thresher. They hope to be able to join a microfinance program once their capital reaches BDT 100,000 (USD 1,260).

“Truly, participation from the local community through the water management group affords people a sense of control over their own lives and livelihoods,” said Dr. Mondal. “With a simple change in water management, the road toward the project goal for people to increase their productivity and food security can be realized.”



A photograph showing five men in a rural setting operating a manual water pump. The pump is a blue metal structure with a large hand wheel, mounted on a concrete base. One man in a patterned shirt and striped dhoti is turning the wheel. Another man in a green shirt stands nearby. Two other men are perched on the concrete structure, one in a green tank top and one in a striped dhoti. A fifth man, shirtless and wearing a striped dhoti, stands with his back to the camera. The background features lush green trees and a clear sky.

*"Water management has become the key entry point in changing people's lives and has triggered socioeconomic development in the coastal zones of Bangladesh."*

*Sudhir Yadav  
IRRI water scientist*

# Rice straw: where there's smoke, there's a solution

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In Southeast Asia, rice straw is a major rice byproduct that is usually burned in the field, a practice that has detrimental effects on the environment and human health. The Mekong River Delta produces about 10 million tons of rice straw, 10% of which comes from the rice fields of Can Tho Province in Vietnam, according to Nguyen Thi Kieu, deputy director of the Department of Agricultural and Rural Development.

A new project, *Scalable straw management options for improved farmer livelihoods, sustainability, and low environmental footprint in rice-based production systems*, was launched in 2016 to provide a holistic approach to identify

and promote environmentally sustainable options to manage rice straw while improving livelihoods of smallholder farmers in the Philippines, Cambodia, and Vietnam.

The IRRI project will assess different straw management options, including value adding potential and environmental footprint, build capacity of farmer intermediaries on providing advisory services for best straw management practices, and provide policymakers with information on creating enabling environments for best practices on rice straw management.

These activities will be carried out through the use of innovative

technologies, management options, and business models.

“Engagement with the private sector is important to develop business models on how farmers can make use of the equipment to the most benefit,” said Martin Gummert, IRRI senior scientist and project coordinator.

“Hopefully, this project will come up with practical solutions to manage rice straw as well as increase farmers’ income,” added Dr. Nguyen.

The project is funded by the German Federal Ministry for Economic Cooperation and Development (BMZ).

*For every 4 tons of rice grain, 6 tons of straw are produced. Asia produces about 550 million tons of straw. The Mekong River Delta produces about 10 million tons of rice straw.*









# IRRI scientist recognized for developing drought-tolerant rice for Nepalese farmers

**A**rvind Kumar, a senior scientist at the International Rice Research Institute (IRRI), leads the South Asia plant breeding group for the rainfed lowlands at the institute. He has expertise in trait development for drought, aerobic rice, and dry direct seeded rice. He also improved several popular rice varieties for drought tolerance as well as developed a drought plus submergence-tolerant version of the popular Indian rice variety Swarna.

Nepal has released six drought-tolerant rice varieties (Sukha Dhan 1-6) and two submergence varieties (Swarna-Sub1 and Samba Mahsuri-Sub1). These climate change-ready varieties have gained much popularity and are spreading to large areas of the

Nepal Terai and river basin. The varieties have made a significant impact in minimizing the risk of major stresses that affect poor farmers in the country.

“Rice is a vital crop in Nepal, contributing to about 10% of the GDP,” said Dr. Y.R. Pandey, NARC executive director. “However, rice farming in the country is dependent on the monsoon and very much prone to drought and flooding risks. Since its establishment 25 years

ago, NARC has had a long and admirable history of collaboration with IRRI and in developing rice varieties that have tackled various challenges, including the current climate change issues.”

Some of the successful collaborative projects between NARC and IRRI include water-saving, stress-tolerant rice for Africa and South Asia, and accelerating the adoption of stress-tolerant rice varieties.

*As part of its Silver Jubilee, NARC acknowledged the “tireless contribution” of Dr. Arvind Kumar in improving drought-tolerant rice varieties and making them available to Nepalese farmers.*









# Resistance from within

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**B**rown planthopper (*Nilaparvata lugens*) is an insidious insect with a massive appetite for destruction. These insects, also called BPH, attack in frighteningly large numbers and commence a feeding frenzy at the base of the rice plant. Hundreds of thousands of stylets—mouthparts designed for piercing tissues—suck out the sap that nourishes the plant.

“BPH can destroy whole fields,” said Kshirod Jena, a plant breeder at IRRI. “That’s why they are the number one enemy of rice farmers in Asian countries.” The most extensive damage from the pest have occurred in India, Indonesia, the Philippines, Thailand, Vietnam, Japan, Korea, and Taiwan, with estimated annual losses of 2–3 million tons across the region.

Through a recently developed process known as gene cloning, they were able to study how resistance genes interact with insects and fully understand how plants are able to fight them off. In 2016, Dr. Jena and his team at IRRI successfully cloned the *Bph18* gene from a wild species of rice. This gene will be transferred into IRRI rice varieties to protect against aggressive BPH populations.

The genetic resistance to BPH can last up to 5–10 years before it is breached again, according to Dr. Jena. But thanks to gene cloning, scientists are now doing something to make it last even longer. At IRRI, Dr. Jena’s team is creating a package of resistance genes by combining *Bph18* with other resistance genes that have

been identified through gene cloning. This gives the plant durable or longer resistance, up to 15 years or so, compared with single gene resistance. Once ready, the resistant lines will be sent to different locations in Asia that are affected by BPH problems for field testing.

BPH is expected to overcome even the triple-gene protection. “Once insects mutate they become more virulent,” said Dr. Jena. “What we can do is continue making new gene packages and put them into rice plants. It is crucial to identify more genes and understand their mechanism of resistance to develop rice varieties with long-term BPH resistance.”

*Scientists are using rice genes as a weapon to fight off the notorious brown planthoppers.*







# Igniting a "seed revolution" for African and Asian farmers

The lack of good-quality seed is one of the major constraints in rice production in many developing countries. In many poor rice-growing countries, the farmers rely heavily on farmer-saved seed for their crop production rather than commercial seed produced by the private sector.

Unlike commercial seed, farmers' seed is not certified by government authorities to ensure the best possible harvest. By providing seed with inferior quality, the farmers themselves may be unintentionally contributing to food insecurity, according to the Food and Agriculture Organization. Knowledge of the technical side of seed production and understanding the benefits of using quality seed are important aspects of enhancing the seed systems and the use of quality seed

among farmers to improve their food security.

To bridge the gap, the Training and Impact Acceleration Unit of IRRI conducted the Quality Breeder and Foundation Seed Course for researchers, seed inspectors, and seed producers. The course was developed by IRRI in collaboration with the Japan International Cooperation Agency (JICA). Twenty-one rice researchers and seed specialists from 10 countries attended the 3-week course, which ran from 12 to 30 September. Most of the participants were from member-countries of the Coalition for African Rice Development (CARD), including The Gambia,

Ghana, Liberia, Nigeria, Rwanda, Sierra Leone, and Zambia. Three participants came from Cambodia, India, and Nepal.

"The program was designed to provide a mix of skills training in the field, interaction and learning from researchers and scientists, and discussions and cross-learning opportunities among participants," said Jason Beebout, project manager of the Impact Acceleration Unit. "At the end of the course, participants were asked to pull together what they had learned into a plan so that they can integrate their new knowledge into their day to day work roles and responsibilities."

*"We do hope this contributes to the ongoing CARD activities and can be a spark that ignites a seed revolution."*

*Jason Beebout*

*Project manager of the Impact Acceleration Unit at IRRI*









# Covering 7,000 islands with a network of people

Agricultural extension workers are crucial in disseminating information and providing recommendations to increase the productivity of Filipino rice farmers. “Our role is to be agents of change by extending good technologies to farmers to increase their rice production,” said Ms. Jurevey Lagaras, an agricultural technologist. “If we cannot determine what rice disease or insect pests are present, we will not be able to provide the correct recommendations.”

To enhance their skills, more than 120 extension workers from all regions of the country attended a workshop to prepare for widening the coverage of a monitoring and information system for sustaining stable rice production. The Crop Health Training Workshop, held at the IRRI headquarters was conducted by the Philippine Rice Information

System (PRISM). The participants learned more about identifying and managing rice diseases, animal pests, and weeds as well as how PRISM’s protocol for crop health assessment and characterization of production situations can be effectively introduced in farmers’ fields. PRISM integrates data from remote sensing, crop modeling, and smartphone-based surveys to deliver accurate, timely, and actionable information on rice crop seasonality, area, yield, flood and drought damage, and crop health.

“With the involvement of extension workers, it is easier to tap more people as we expand our monitoring sites,” said Ulysses Duque, a crop protection expert

from the Philippine Rice Research Institute (PhilRice). PRISM has been monitoring 1,060 fields throughout the country since the second semester of 2016.

Agricultural technologist Mina Joy Wigan encouraged other extension workers to support PRISM. “We hope we can convince other extension workers to participate in the project since our goal is to have an accurate and timely database with national coverage.”

PRISM is a project of the Philippine Department of Agriculture, PhilRice, IRRI, and sarmap. It is funded by the Department of Agriculture.

*“Being part of this national project is the first step to reach our common goal, which is to provide food self-sufficiency in the country.”*

*Vincent Jun Caminero  
Municipal agriculturist*









# The next evolutionary step for IRRI's training program

In 2016, IRRI's Training Center went through major changes. Dr. Noel Magor, former head of the center, undertook new duties, that of leading the Impact Acceleration Unit and being the IRRI Bangladesh representative. Dr. Peter Brothers was appointed as head of the center, which has been renamed as IRRI Education.

The work of the unit is also being extended. Previously the unit generally undertook training work in terms of grants received by IRRI. This meant that students would be invited to attend courses fully funded by the IRRI grant. In addition to maintaining such activities, IRRI Education also devised a portfolio of courses that will be offered for students who are self-funded. The portfolio contains course offerings in science, best practices in farming, and leadership. Market assessment studies indicated interest in the courses from both the public and private sectors.



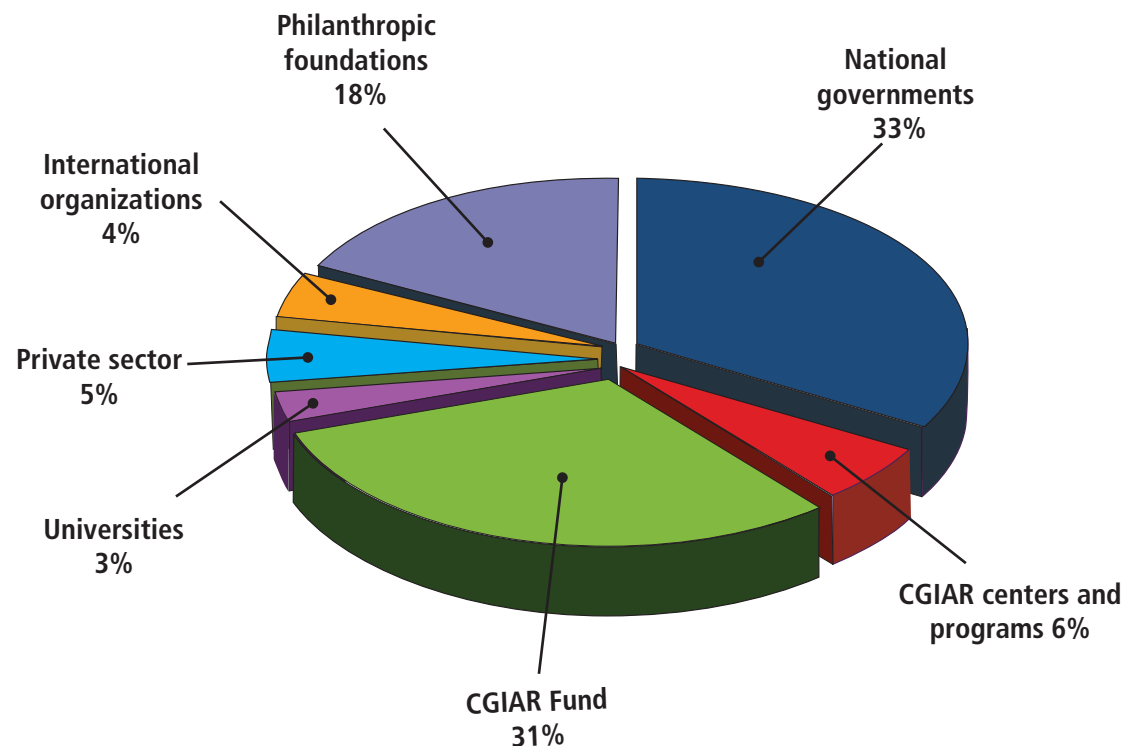
*In terms of training performance over 2016, the Training Center delivered **24 short courses** with a total attendance of **355 students** (216 male and 139 female), from **43 different countries**. The Center also supports the IRRI Scholars program, in which PhD and MS students come from their universities to undertake research at IRRI supervised by IRRI scientists. In 2016, there were **303 such Scholars at IRRI** (137 male and 166 female), from **73 universities in 29 countries**. In-country training programs for farmers, technicians, researchers, and others conducted through different IRRI projects around the world were attended by **33,293 people** (about 47% female).*



Despite CGIAR Fund budget cuts in 2016, IRRI's financial position remains stable, with total assets of USD 78.47 million compared with USD 80.36 million in 2015. This drop of USD 1.90 million is offset by a corresponding increase in liabilities and decrease in net assets. The liquidity and long-term stability indicators continue to remain above CGIAR benchmarks. IRRI had a net deficit of USD 2.67 million.

In 2016, IRRI's grant revenue was USD 65.76 million, which includes USD 5.29 million of CGIAR GRiSP Windows 1 and 2 funds for our partners, AfricaRice and CIAT. IRRI continues to successfully attract significant new investments to further its mission as well as to help cover gaps due to CGIAR Fund budget cuts in 2016. For detailed information, refer to IRRI's audited financial statements at <http://irri.org/AnnualReport/2016>.

## IRRI revenue by source, 2016



### Summary of financial support to IRRI's research agenda in 2016 (USD 000)

	2016
Asian Development Bank	825
Australia	503
Bangladesh	98
Bayer	345
Bill & Melinda Gates Foundation (BMGF)	11,716
China	223
Chinese Academy of Agricultural Sciences (CAAS)	1,012
CRP Funds, Windows 1 and 2	
CGIAR Fund Windows 1 and 2 - CRP 3.3 (GRiSP)	16,102
CGIAR Fund - Genebank	1,788
International Center for Tropical Agriculture (CIAT) - CRP 7 (CCAFS)	1,717
International Food Policy Research Institute (IFPRI) - CRP 2 (PIM)	260
International Water Management Institute (IWMI) - CRP 5 (WLE)	237
CGIAR Centers	
Africa Rice Center	281
CGIAR	21
International Center for Tropical Agriculture (CIAT)	2
International Center for Maize and Wheat Improvement (CIMMYT)	1,622
International Crop Research Institute for Semi-Arid Tropics (ICRISAT)	91
International Food Policy Research Institute (IFPRI)	30
World Agroforestry Center (ICRAF)	49
Challenge Programs	
Harvest Plus	1,715
European Commission	101
Food and Agriculture Organization of the United Nations (FAO)	264



	2016
France	350
Germany	
Federal Ministry for Economic Cooperation	1,247
Global Crop Diversity Trust	596
Hybrid Rice Research and Development Consortium (HRDC)	304
India	2,289
Indonesia	45
International Fund for Agricultural Development (IFAD)	543
Japan	1,395
Kellogg Foundation	32
Korea	835
Philippines	4,811
Portugal	421
Switzerland	1,844
SARMAP	409
Syngenta	661
Thailand	74
Turkey	34
United Nations Environment Programme	110
United States of America (USA)	6,158
Vietnam	129
Others	4,474
<b>TOTAL</b>	<b>65,763</b>

## A culture of employee engagement, meaningful work, and teamwork

The role of Human Resource Services is critical in ensuring that IRRI has a high-performing and engaged workforce to carry out its research strategy while fostering a work environment that encourages innovation and creativity and promotes health and wellness, gender equality, diversity, and work-life balance.

As part of continuing efforts to improve internal communications, HR modernized its web presence to maximize use of 'e-communications' and promote positive workplace relations and employee well-being.

IRRI created a new division, Integrative Impact, to house the trans-divisional and cross-regional disciplines within one division. They will work with and across the Social Sciences, Genetics and Biotechnology, Crop and Environmental Sciences, and Plant Breeding Divisions.

The year yet again proved busy for senior level recruitment where the director of Operations, heads of IRRI Education and the Communication Unit, and IRRI's Southeast Asia representative, along with several other senior positions, were recruited.

### 2016 Quick Stats

**1,152**  
worldwide staff

**147**  
globally recruited staff

**1,005**  
locally recruited staff

**42**  
nationalities

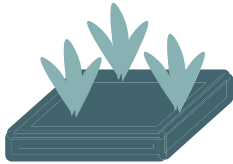
**10**  
offices in Asia and Africa

**42%**  
women in worldwide staff



# Importance of rice

harvested from  
**157 million**  
hectares  
(8% of world  
crop land)



used  
**27 million**  
tons of fertilizer  
(15% of world  
total)



received  
**440 km<sup>3</sup>**  
irrigation water  
(35% of world  
total)



grown by  
**144 million**  
farm families  
(25% of world  
farmers)



produced  
**740 million**  
tons of paddy rice  
(30% of world  
grains)



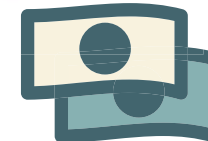
was home to  
**400 million**  
rural poor  
(40% of world poor)



fed  
**4 billion**  
people  
(56% of world  
population)



was the staple  
food for  
**650 million**  
hungry people  
(80% of world  
undernourished)



valued at  
**206 billion**  
US dollars  
(13% of world crop  
value)



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