

Annual Report 2015

A start and

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.

Our goals

- Reduce poverty through improved and diversified rice-based systems.
- Ensure that rice production is stable and sustainable, does minimal harm to the environment, and can cope with climate change.
- Improve the nutrition and health of poor rice consumers and farmers.
- Provide equitable access to information and knowledge on rice and help develop the next generation of rice scientists.
- Provide scientists and producers with the genetic information and material they need to develop improved technologies and enhance rice production.

IRRI's goals align with the objectives of the Global Rice Science Partnership (GRiSP) that coordinates rice research among more than 900 international partners.

Our research agenda and policies are determined by a board of trustees, guided by input from our partners, donors, end users such as farmers, and our staff.

On the cover: The newly inaugurated Lloyd T. Evans Plant Growth Facility is a state-of-the-art structure in which various climate scenarios can be simulated under controlled environmental conditions to understand the effects of climate change on plant growth.

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Director General's message

IRRI in 2015—celebrating achievement and recommitting to our mission



A s IRRI's incoming director general, I am in the unusual position of writing a message for the 2015 Annual Report when Bob Zeigler provided inspiring leadership during the first eleven and a half months

of the year. On 15 December, Bob concluded his outstanding tenure as director general for over a decade, during which time he guided the institute through a significant period of expansion and presided over resurgences in its science and delivery agenda. Bob left the institute with a sustained set of accolades, but none greater than receiving the <u>Order</u> of Sikatuna from the Government of the <u>Philippines</u>, the highest award available to a foreign national. (Learn more about Bob on

page 18 of this brochure and via his *IRRI Pioneer Interview* at <u>http://ricetoday.irri.org/</u> zeigler-full-interview)

For most of 2015, it was my honor to serve as deputy director general for research. So,

I am able to comment on the wonderful research and delivery outcomes achieved by the institute. Indeed, 2015 was a year rich in scientific achievement, in building and consolidating partnerships, and in delivering on our capacity-building objectives.

There were considerable scientific achievements, with <u>243 refereed articles and</u> <u>book chapters</u> published in international peer-reviewed journals and scientific books. Justice cannot be done to recognizing the quality of this collective body of research in a short message, but I draw attention to three papers to exemplify the quality of the overall effort:

First, the cover story article in the September issue of <u>Nature Plants</u> announced the genetic basis of the AG1 gene, which enhances anaerobic germination tolerance in rice. This work unlocks a mechanism for breeding rice varieties that can survive early flooding or that can be sowed into waterlogged fields, enhancing yields and suppressing weeds.

A second landmark article in <u>Nucleic Acids</u> <u>Research</u>, was about the <u>SNP-Seek database</u> from the <u>3,000 genomes project</u> being made publicly available, providing the world's rice science community with a fantastic new resource for accelerating genetic studies in rice.

And third, a transdisciplinary group of scientists from IRRI and partner institutions published their work in *Nature's Scientific Reports* describing how they succeeded in increasing iron and zinc levels in rice through biofortification—a <u>breakthrough in the global</u> <u>fight against micronutrient deficiency</u> or "hidden hunger." Although this article was published in January 2016, I wasn't going to wait a full year to announce it.

Two projects involving the optimization of inputs to rice farming gained considerable attention during the year. The <u>Crop Manager</u> project provided more than 300,000 farmers in the Philippines access to optimized crop production recommendations through the internet and mobile phone technology. The project is now being rolled out in Vietnam, Indonesia, Bangladesh, and several states in India. During the year, <u>IRRI worked closely</u> <u>with the United Nations Environment</u> <u>Programme</u> and a wide range of private sector partners to accelerate the <u>Sustainable Rice</u> Platform, which offers a range of indices through which the sustainability of rice production practices can be measured and defined.

IRRI performed in an outstanding manner despite some significant challenges. The CGIAR resolved to embark on a second round of reforms, setting in motion a complex process to restructure its governance setup and operational entities. Unfortunately, funding available to CGIAR decreased significantly in 2015 and IRRI had to make significant workforce reductions. Despite these setbacks, our research and delivery efforts pressed on with vigor and accomplishment. In a very positive development, a first-stage proposal for refunding of the CGIAR Research Program on Rice (also known as the Global Rice Science **Partnership**) proceeded and received very strong positive reviews ahead of a secondround approval process in 2016.

A real highlight during the year was the April visit of Bill Gates to IRRI headquarters. Bill spent a day with us and took a closer look at our research programs. It was a great experience to behold the breadth of his knowledge on rice as well as the enthusiasm of his engagement with our scientists. The support provided by the Bill & Melinda Gates Foundation and other donors is fundamental in enabling the institute to bring critical technologies, submergence-tolerant germplasm for example, to more farmers faster. In his blog, Bob Zeigler gives us a unique perspective on "<u>the visit</u>."

I also want to make special mention of <u>the</u> <u>visit to IRRI of Japan's Imperial Couple</u> in January 2016, which underscored Japan's commitment to world food security and the close and enduring relationship between the country and IRRI.

IRRI continued its very strong regional engagement program, assisting <u>Myanmar</u> and <u>Vietnam</u> in developing strategies to enhance their rice sectors. IRRI also joined with India to celebrate the 50th year of the Directorate of Rice Research (renamed during its jubilee year as the Indian Institute of Rice Research) and the annual meeting of its <u>All-</u> <u>India Coordinated Rice Improvement</u> <u>Project. This milestone</u> highlighted the work of IRRI in India and the wonderful contributions of <u>Indian scientists to IRRI</u> over the years.

As an example of our commitment to mainstreaming gender, IRRI continued to work in 2015 with local partners in India, such as Pradan and the Dhan Foundation. These efforts have enhanced <u>a women-led</u> <u>technology delivery model in Odisha</u>. Also see <u>Her Story</u>, a fantastic compilation of recent gender stories involving IRRI from 2015 and previous years for International Women's Day 2016.

IRRI is in great shape to deliver on its mission over the coming decade. We have a well-stocked pipeline of discoveries and innovations. We have a wonderfully talented and committed workforce, engaged across the rice world. We have built the world's most comprehensive international rice genebank. We have strong and enduring partnerships and the backing of committed donors. As an institute, we recognize that it is imperative that we act as quickly and effectively as we can to develop and deliver the technologies needed to enhance the lives of millions of farmers and consumers in urban and rural areas who rely on rice for sustenance and livelihood. To recommit to this challenge in 2016 will be our honor and privilege.

You can find on IRRI's website details and backstories on what I have mentioned here and other items summarized in this handy time-saving brochure. Go to http://irri.org/ *AnnualReport/2015* where we present our 2015 achievements and activities in a visually pleasing package.

Matthew Movell

Matthew Morell Director General

Milestones

In April, <u>Bill Gates visited IRRI</u>. During interactions with IRRI staff, he was shown how the institute is drawing on simultaneous revolutions in genetics, genomics, molecular biology, bioinformatics, plant physiology, information and communications technology,



computational power, and remote sensing—combined with 'big data'—to grow a second Green Revolution for those hundreds of millions of people left behind by the first.

In April, the Bill & Melinda Gates Foundation lauded the Stress-Tolerant Rice for Africa and South Asia project for speeding up the process of bringing new rice varieties to farmers.

In April, the Golden Rice Project won the prestigious <u>2015 Patents for</u> <u>Humanity Award on Nutrition</u> in ceremonies at the White House in Washington, D.C.

In May, the National Museum of the Philippines elevated two paintings by National Artist Vicente Manansala to <u>National Cultural</u> <u>Treasures</u>. Since 1962 and until April 2015, these paintings (one shown above right) were housed in Harrar Hall at IRRI headquarters.



In May, the <u>Myanmar Rice Sector Development Strategy was</u> <u>launched</u> at the Department of Agricultural Research in Nay Pyi Taw. During the launch, IRRI Director General Robert Zeigler awarded a special rice memento to Myanmar President U Thein Sein for his visionary leadership of the rice sector.

In July, the <u>IRRI Board of Trustees (BOT) appointed Dr. Matthew</u> <u>Morell as the next director general of the institute</u>. Dr. Morell, who served as IRRI's deputy director general for research since February 2014, assumed the position in December 2015.

In September, <u>George</u> <u>Kotch became IRRI's head of</u> <u>plant breeding</u>. He spearheads the development of innovation and innovative products at IRRI while designing and leading its R&D processes. Prior to joining IRRI, Dr. Kotch was the president



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and founder of a consulting firm specializing in developing agribusiness companies and technology assessments.

In September, the massive collection of more than <u>3,000 rice</u> <u>varieties</u> that have been sequenced in a collaborative project involving IRRI, CAAS, and BGI were made available free online as an Amazon Web Services Public Data Set.

In October, IRRI's C_4 rice was featured in a *Newsweek* story, <u>**To feed**</u> human kind, we need the farms of the future today</u>.

In October, Dr. Robert Zeigler received the <u>Order of Sikatuna, Grand</u> <u>Cross (Rank of Datu), Gold Distinction (Katangiang Ginto)</u>. It is the highest award that a foreign national can receive from the Philippine Government.

In November, an event, *Sharing the Harvest,* featured the public unveiling of IRRI's three Manansala studies in the Philippine National Museum's IRRI Hall, as well as the launch of the *Guide to the Birds of Philippine Rice Fields* and the 2016 *Heirloom Rice Recipe Calendar.*



In December, <u>Jacqueline d'Arros Hughes was appointed as IRRI's</u> <u>eighth deputy director general for research</u>. Dr. Hughes brings to IRRI a combination of agricultural research leadership and management expertise, with a career spanning more than three decades in Asia, Africa, and Europe. At IRRI, she will oversee the institute's global research agenda in plant breeding, genetics, crop and environmental sciences, and the social sciences.

In January 2016, Jim Godfrey became



chair of IRRI's board of trustees. A board member since 2013, Dr. Godfrey's expertise includes governance and agricultural systems. Prior to joining the IRRI BOT, he was board chair of the International Potato Center, the Scottish Crop Research Institute, and of the Alliance of the 15 CGIAR centers.



Their Majesties Emperor Akihito and Empress Michiko received

an overview of IRRI and the institute's vibrant partnership with Japan during a short visit to its headquarters.

For more 2015 milestones and links to the details, go to <u>www.irri.org/</u> <u>AnnualReport/2015</u>; for milestones across 56 years of IRRI's rich history, go to <u>www.irri.org/about-us/our-history</u>

Research highlights

Breaking Science

Unlocking the secret to underwater rice seed survival

A team of scientists from IRRI and the University of California Riverside published in <u>Nature Plants</u> a study unlocking the secret to just how rice seeds might be able to survive when grown under water. They have identified a gene that controls the availability of sugar to a growing seed, especially when under flooded conditions.



Rice survival under flooding is important when it comes to direct seeding, in which seeds do not have to be pre-germinated and then transplanted. With direct seeding, seeds can be directly sown or broadcast into the field, requiring less time and energy from farmers.

The newly discovered gene, *AG1* or *OsTPP7*, creates an 'all or nothing' escape mechanism that "tricks the seed into thinking" that more sugar should be given to its shoot—the plant part that grows into stems and leaves—so that the seed under water is able to grow more quickly and reach the surface of the water. The mechanism works when the seed is submerged up to a water depth of 10 cm, and can get 'activated' as soon as the seed is sown. For more details, go to ricetoday.irri.org/secret-unlocked-to-rice-seed-survival-underwater

Genetically engineered rice with high levels of iron and zinc is developed

Scientists have succeeded in increasing iron and zinc in rice through biofortification—a breakthrough in the global fight against micronutrient deficiency. Their research was recently published in *Nature's Scientific Reports*.



ron (Fe) deficiency is the most pervasive form of malnutrition and a leading cause of anemia in women and children. Zinc (Zn) deficiency causes stunting and has serious consequences on health, particularly during childhood.

Polished rice grains generally contain only about 2 micrograms of Fe and 16 micrograms of Zn per gram. With limited variation in grain Fe content across the rice gene pool, conventional breeding efforts have fallen short of reaching 13 micrograms of Fe and 28 micrograms of Zn per gram of polished rice to fulfill 30% of the estimated average requirement in humans.

The study found that the genetically engineered rice has significantly increased levels of Fe (up to 15 micrograms) and Zn (up to 45.7 micrograms) per gram of polished rice that human cells can potentially absorb. For more details, go to ricetoday.irri.org/genetically-engineered-rice-with-high-levels-of-iron-and-zinc-is-developed

Applied science

A first look at Asia's rice areas using Sentinel-1A satellite imagery

Radar imaging via satellite is an important tool for rice mapping and monitoring. It can provide detailed information on Asia's rice crop, such as planted area, seasonality, cropping intensity, and damaged area due to floods or drought, as well as information on rice crop growth.



RRI and its partners use remote sensing imagery from satellites to generate information on the rice crop, such as planted area, seasonality, cropping intensity, and damaged area due to floods or drought. Information on crop growth from such imagery can also be used with crop growth simulation models to estimate yield.

The European Space Agency (ESA) satellite, Sentinel-1A, launched in 2014 can provide regular 'snapshots' of Asia. The imagery is derived from synthetic aperture radar (SAR) systems that can monitor the earth's surface day and night, even through rain or cloud cover—hence, images even during the monsoon season—making the tool perfect for rice crop monitoring.

Sentinel-1A will continue to acquire images over the region, and these images will become increasingly useful as they reveal the progress of the rice crop over time, season after season. The ESA Sentinel program has a big role to play in the future of satellite-based remote sensing for rice crop applications. For more details, go to irri.org/news/media-releases/satellite-imagery-to-soon-enable-large-scale-

monitoring-of-asia-s-rice-areas

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ORYZA model a big hit in global rice research

ORYZA2000, a computer program that simulates growth and development of rice under a wide range of environments, has been cited by scientific papers more than 16,600 times as a tool for rice research and crop management. Developed at IRRI, ORYZA2000 has become an important tool in modern agricultural research.



ORYZA and ORYZA2000 have been used to test hypotheses before conducting field experiments, extrapolate observed data from field experimental sites to regional scales over different time periods, and provide information for decision-making on crop management, food security, climate change adaptation, and improvement of the sustainability of rice production systems.

"In China, hundreds of research groups, students, and government agencies are using ORYZA2000 and/or ORYZA rice model for different purposes," says Tao Li, IRRI scientist and crop modeler who leads the Crop Modeling Team.

The ORYZA model has become widely popular because users are confident of its output predictions that include yield, water and fertilizer use, and environment impacts on a variety's performance. User communities are growing quickly not only in Asia, but also in America and Africa.

For more information go to <u>sites.google.com/a/irri.org/oryza2000/about-oryza-version-3</u>

Rice against the tide

A new kind of rice is helping Filipino farmers in Bohol cope with seawater encroaching on their paddies. In the race against climate change impacts, such as rising sea levels, rice scientists will hopefully be able to stay one step ahead of the game here and elsewhere.



Millions of hectares in the humid regions of South and Southeast Asia are suitable for rice production but are not cultivated or suffer from very low yields because of salinity and problem soils. As much as rice is an important food staple consumed by more than half of the world's population, it is also the most susceptible to salinity among all cereal crops.

IRRI has developed several salt-tolerant rice varieties for South and Southeast Asia to help farmers sustain their food supply and cope with climate change. One recent example is Salinas 11 (or IRRI 169), a Green Super Rice (GSR) variety especially bred for salt-ridden areas of the Philippines. GSR varieties carry a mix of traits from more than 250 different rice varieties. More than 10 other salt-tolerant rice varieties have been developed through the Stress-Tolerant Rice for Africa and South Asia project and are being commercialized in Asia. For more details, go to <u>ricetoday.irri.org/rice-against-the-tide</u>

Partnership

Myanmar recognizes IRRI partnership for improving country's rice sector

During a March 2015 event in Nay Pyi Taw, Myanmar's top executives, including President U Thein Sein, himself a farmer, and Vice President U Nyan Tun recognized high-performing farmers and farmer groups, extraordinary farm products, and IRRI, among other organizations, that have supported the development of the country's agriculture sector.



Since 1965, the Myanmar-IRRI partnership has enhanced the country's rice sector. Key achievements of this partnership include the release of 69 improved varieties bred to help farmers increase productivity despite difficult rice-growing conditions. These hardy varieties will become more and more crucial in adapting to the effects of climate change. Joint work with the private sector has resulted in the installation of more than 300 dryers across the country, benefiting about 35,000 farmers with better-quality grains that command higher market prices.

More than 440 agricultural scientists and extension workers from Myanmar received training at IRRI. A number of alumni now hold key positions in the country's agricultural research agencies. For more details, go to <u>news.irri.org/2015/05/</u> myanmar-poised-to-regain-major-role-in.html

Partnershipdriven science

In recent decades, India and the Philippines have transitioned from being solely research beneficiaries to partners by financing some of their own research activities at the institute. This new kind of partnership, which IRRI wants to explore and grow with other nations as well, could fund the nextgeneration of rice science.



From its founding, IRRI has been sustained by the deep pockets and generosity of donor agencies. The high-yielding rice varieties, modern technologies, and scientific advances that changed the course of rice production are all knowledge-based public goods available to every country, regionally or even globally, that needs them. None of those would exist today without the funding provided by philanthropic foundations, international organizations, and governments of mostly Western countries.

In the past decades, however, the focus of the aid architecture on the development landscape has been gradually shifting from Western-centric to various emerging medium-sized and small development partners.

Increasingly, as countries become richer and have a higher technical base, they come to IRRI to fund joint programs targeted to their specific interests. The development activities funded by emerging research investors known as "partner countries" are rapidly growing in importance. For more details, go to <u>ricetoday.irri.org/</u> partnership-driven-science

Tanzania poised to lead rice production in Africa

Tanzania can potentially double or even triple its rice production through a strategy that combines improving agronomic practices, delivering improved high-yielding rice varieties, capacity strengthening in research and outreach, and a good strategy for seed production and distribution. The good relationship between the government of Tanzania and IRRI has been an enabling factor in these ongoing research activities in the country.



Tanzania is set to become the next rice granary in Africa. It has great potential to expand as it has advantages of having ample suitable lands and water resources, and a good climate. The two IRRI-bred rice varieties, released as Komboka and Tai by the National Rice Research Program-KATRIN Research Centre and IRRI-Tanzania two years ago, will greatly help boost the country's productivity.

In addition to improved varieties, capacity building is a key area for IRRI to contribute. IRRI has provided, on the ground, a scientist with expertise in agronomy and seed systems and a local liaison. To make sure that the potential of the new varieties is fully exploited, IRRI is working closely with the Regional Rice Centre of Excellence and other local institutions for the development of improved agronomic management practices and good seed systems for high-quality seed production and delivery to farmers.

The initial success of the rice sector in Tanzania will be a model for other countries in Eastern and Southern Africa. For more details, go to <u>ricetoday.irri.org/tanzania-</u>to-lead-rice-production-in-africa-2

Human resources development

Lee Foundation scholarships assist promising rice scientists

To unleash the great potential of promising students in Asia to help feed the region into the future, a USD 3-million donation has established the Lee Foundation Rice Scholarship Program to educate and train a new generation of rice scientists. Since 1962, more than 15,000 scientists have been trained at IRRI and they now have lead roles in many agricultural research systems. The Lee Foundation Rice Scholarship Program will help secure a strong cadre of highly competent graduates who are essential to continuing this legacy to directly affect regional food security.

In 2015, PhD scholarships in fields allied with the rice sciences were made available for South and Southeast Asian students. The Lee Foundation Rice Scholarship Program granted nine PhD scholarships for students from Bangladesh, India, Vietnam, and the Philippines, and five postdoctoral fellowships.

The grantees are now working with some of the world's



leading agricultural scientists committed to reducing poverty via food security in the rice-consuming and -producing world. IRRI made these scholarships possible through the support of the Lee Foundation Rice Scholarship Program.

Infrastructure

IRRI breaks ground for climate change research facility

In January 2015, with Australian funding of USD 10 million, the groundbreaking for the Lloyd T. Evans Plant Growth Facility started the construction of a state-of-the-art structure in which various climate scenarios can be simulated under controlled environmental conditions so that the effects of climate change on plant growth will be better understood. Exactly one year later (January 2016), the facility was dedicated and opened.



RRI is committed to keep working toward food and nutrition security for at least the next few generations. The facility is funded by the Australian government through the Australian Centre for International Agricultural Research, a major partner of IRRI. It is named after Dr. Lloyd T. Evans, a world-renowned Australian plant physiologist who also once served as a member of the IRRI board of trustees.

Climate change is a concern that cuts across the various areas of IRRI's research agenda. Knowing about its implications on rice production, via a better understanding of physiological processes and interactions in the rice plant when subject to changing temperatures, humidity, amount of sunshine, and atmospheric gases, will help scientists develop even sturdier climate-ready rice varieties and finer farming practices to accompany these. For more details, go to <u>irri.org/news/media-releases/irri-breaks-</u> ground-for-australia-funded-plant-growth-facility

IRRI Director General Robert S. Zeigler retires



n 2015, Robert S. Zeigler, an internationally respected plant pathologist with more than 30 years of experience in agricultural research in the developing world, retired after completing more than 10 years as IRRI director general—the second longest tenure behind only that of the Institute's founding DG, Robert F. Chandler, Jr. (1960-72). As DG, Bob was a passionate spokesperson on a wide range of issues that affect rice growers and consumers worldwide.

Bob had a productive research career on diseases of rice that focused on host-plant resistance, pathogen and vector population genetics, and their interactions to develop durable resistance and sustainable disease management practices. As Bob's career moved increasingly toward research management, his interests expanded to include broader crop management issues, the social forces shaping the agricultural environment, and finally the economic and political arena that frames food security and poverty issues. He has published more than 100 scientific works in these areas and often serves as an expert resource on rice security in the regional and global media.

In August 2015, proclaiming himself an introvert, Bob gave a wide-ranging IRRI pioneer interview with his customary wit and candor. In addition to his early years, he covered his professional life, which spanned time spent in Africa, Latin America, Asia, and the United States.

During the interview, which can be found online at <u>http://ricetoday.irri.org/zeigler-</u> <u>full-interview</u>, he equated the staff of IRRI as being the wheels of a brilliant machine.















The human Resource Services' goal is to recruit and retain dynamic people that possess the competencies and skills required for IRRI to implement its research strategy while maintaining gender and diversity balance across all levels.

We are committed to the development and well-being of our national and international staff, which exceed 1,100 worldwide. We have more than 1,040 nationally recruited staff and 138 globally recruited staff in 10 different locations in Asia and Africa.

IRRI's workplace thrives on diversity and 35 nationalities are represented in our staff group, all working to support IRRI's mission globally. We are particularly proud to be an employer that values gender equality: 41% of all our staff worldwide and 36% of our HQ nationally recruited staff are women and we strive to improve these further.

IRRI undertook a workforce adjustment and restructured part of its research division into the Plant Breeding Division and the Genetics and Biotechnology Division. We also moved to an online performance management system, *My*



Performance Plans, Appraisal and Development, covering the full process from workplans to mid- and year-end reviews and identifying training/development plans for all staff. Performance-related management information reports can now be easily generated, reducing staff time and costs.

The year proved to be a busy year for senior level recruitment, during which the new director general, deputy director general for research, and a division head, were globally selected along with several other senior positions. Despite CGIAR Fund budget cuts in 2015, IRRI's financial position remains relatively stable, with total assets of USD 80.36 million compared with USD 99.71 million in 2014. This drop of USD 19.35 million is offset by a corresponding drop of USD 18.17 million in liabilities. The liquidity and long-term stability indicators continue to remain above CGIAR benchmarks. IRRI had a net deficit of USD 1.18 million resulting from a surplus of USD 1.01 million on normal operations that was offset by one-time costs of USD 2.19 million (workforce adjustments and other planned investments). In 2015, IRRI's grant revenue was USD 92.02 million, which includes USD 8.10 million of CGIAR GRISP Windows 1-2 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 2015 and, likely, additional cuts in 2016.

For detailed information, refer to IRRI's audited financial statements at <u>http://irri.org/AnnualReport/2015</u>.



Training is a powerful strategy for creating competent individuals and institutions. By supporting men and women to acquire the necessary knowledge and skills, they can advance the mission of eradicating hunger and poverty through sustained increases in rice productivity.

In 2015, IRRI hosted 338 scholars (168 males, 170 females) from 33 countries in Africa, Americas, Asia, Europe, and the Middle East.

The Training Center conducted 27 short courses on rice production, plant breeding, language and communication, and other technical subjects attended by 421 trainees from 33 countries in Asia, Africa, Australia, North and Latin America, and Europe. In-country training programs for farmers, technicians, researchers, and others conducted across the globe were attended by 18,079 people (about 45% female). Significant training activities for 2015:

- The Lee Foundation Rice Scholarship Program granted an additional 9 PhD scholarships (4 males, 5 females) for students from Bangladesh, India, Vietnam, and the Philippines and 5 Postdoctoral Fellowships.
- A total of 11,984 (about 47% female) farmers attended training through IRRI's partners.
- The 2015 *Rice Research to Production Course* is a joint initiative of the National Science Foundation, Colorado State University, and IRRI. The annual course targets the development of a new generation of plant scientists that are well networked into the international community and understand the importance of innovative plant science in addressing global problems.
- *Rice Technology Transfer Systems* focused on developing an appreciation of the rural development program in Korea and enhancing the capabilities of rural extension agents.



- The Regional Training Course on Nutrient Management and Farm Management Strategies to Improve Crop Water Productivity using Aquacrop Model was conducted in collaboration with the International Atomic Energy Agency.
- The Monitoring and Evaluation (M&E) Course targeted M&E practitioners, project and program managers, researchers, and database managers. The course aims to provide a deeper understanding of M&E to improve implementation, decision-making, and management capacities through learning and action.

Recent achievements by IRRI and its partners



Released drought-tolerant rice



Doubled salt tolerance

in rice by crossing wild rice with cultivated rice.





Advanced healthier rice research



with the goal of improving the nutritional status of rice consumers.

Enabled women in Asia and Africa to learn and share rice production technologies.



Found a key gene for phosphorus

uptake that can increase rice yield by

20%



Started a scholarship program to support young rice scientists.



Reduced use of pesticides by Vietnamese rice farmers by 20%

Used satellite mapping

to determine where

rice crops are grown

and to aid in disaster response.

Sequenced the genome of 3,000

rice strains and shared the data publicly online for free.





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