

Enriching Rice-Based Economies:

SOUTHEAST ASIA, SOUTH ASIA, & AFRICA



IRRI

IRRI in Southeast Asia



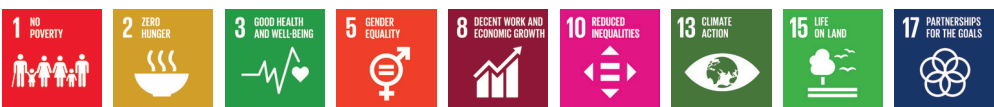
Rice is the staple food for more than half of the world's population, and a predominantly large portion of the global rice supply is produced, traded, and consumed in Asia. Food security thus relies largely on what goes on with rice in this part of the world.

We provide technical and policy support to governments in Southeast Asia for the development of their respective rice sectors. IRRI has been a key global hub for developing and disseminating high-yielding and resilient rice varieties, advanced cultivation technologies, and educational programs and tools to our national agricultural research extension system partners across the region and the world.

CHALLENGES IN SOUTHEAST ASIA

- Adverse effects of climate change with expectation of increasing incidence of flood, drought and coastal salinity.
- Increasing population and demand
- Loss of arable land and competition for water due to urbanization
- Inadequate supplies of high quality seeds and inputs
- Vulnerability of farmers to biotic and abiotic shocks.
- Aging farm populations and increasing labor costs.
- High levels of crop losses in quality and quantity along the production – post harvest value chain.

UN Sustainable Development Goals in Southeast Asia



IRRI's strategy in Southeast Asia



IRRI has assisted agriculture ministries of various Southeast Asian nations in drafting rice sector strategies, guided by the country's unique needs and experience, global trends, and more than 50 years of the institute's research and development into higher-yielding and sturdy rice varieties, technologies, crop management practices, and policy advice.

Foster future-looking policy and collaboration. We work with governments and the private sector to find solutions for current and looming challenges in the rice sector. IRRI has taken the lead in multinational organizations like the Council for Partnership on Rice Research in Asia (CORRA), to creating multi-sectoral consortia for private sector partners like the Hybrid Rice Development Consortium (HRDC) and the Direct Seeded Rice Consortium (DSRC). We are also working with governments to improve the supplies of quality rice seeds to farmers.

Improving nutrition. As staple food for many of the world's poor, rice can be a convenient delivery vehicle for micronutrients that can prevent 'hidden hunger' and stunting in children. We are developing rice varieties biofortified with vitamin A, zinc, and iron, while there is early research on low glycemic index rice which can become part of a healthier diet for people who have, or are prone to, diabetes.

Addressing climate change. Southeast Asia will be seriously affected by climate change. Aside from crafting policy with governments that address its gradual and continuing effects, we are developing climate-smart rice varieties and crop management practices that can help rice production be more resilient to environmental shocks, from flooding and drought, to salinity and extreme temperatures. Further, in areas such as the Mekong delta we are working with partners to develop practices to help reduce greenhouse gas emissions.

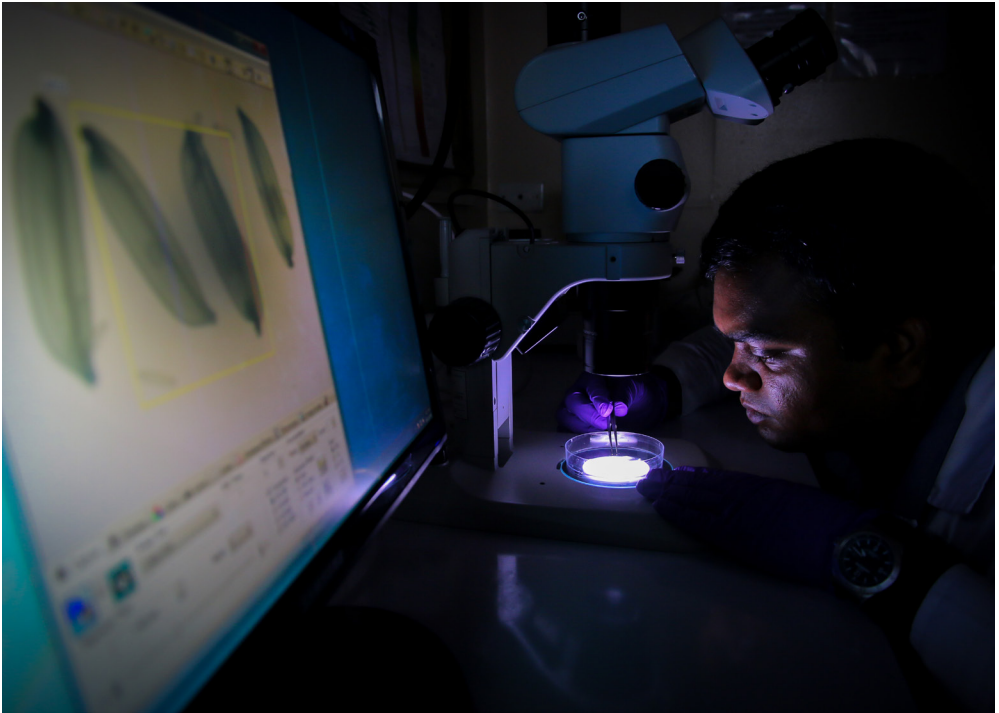
Sustainable intensification. While the demand for rice in Southeast Asia is growing, resources for rice agri-food systems like land, water, and labor are diminishing. Through research and innovation, we are developing ecological approaches to management and resource-conserving technologies to support further intensification and diversification of rice systems. With partners across Southeast Asia are developing options with farmers to reduce the yield gaps which are on average only two-thirds of a farms potential agronomic yield. Through the Sustainable Rice Platform (SRP), IRRI has also developed a series of indicators to assess the sustainability of farm practices.

Addressing losses in the post-harvest value chain. Smallholder farmers tend to incur high losses in quality and quantity the post-harvest chain and, in Myanmar and Vietnam for example, IRRI is working with partners to introduce options for drying and storage. Technologies include small scale solar or rice-husk fueled dryers and hermetic storage bags that can be introduced at village level.

Rice seed conservation. Through the International Rice Genebank, we are safeguarding rice genetic diversity from all over the world to enable research and breeding of improved rice varieties. IRRI is also exploring the genetic diversity of the germplasm to identify novel sources of traits / characteristics required in the future generations of rice varieties for Asia.

Building knowledge and capacity. We establish systems and support existing ones that facilitate knowledge dissemination and adoption of rice technologies across major rice-producing areas. From IRRI Education and online databases and apps, to mechanization and on-the-ground knowledge delivery with our NARES partners, our efforts are aimed to ultimately benefit farmers.

IRRI in South Asia



The Green Revolution helped transform the South Asia region from one of food deficits to surpluses and subsequently moved millions of people out of poverty. Today, there is the opportunity to build on that success by releasing the untapped potential in the rice agri-food sector.

If South Asian farmers can improve farm productivity, increase resource-use efficiency, diversify their crops and gain better market access, then the livelihoods, nutrition, and income of millions of smallholder farmers and their families could be improved substantially.

IRRI will work in partnership with policy makers and national research and extension systems (NARES) to deliver consolidated

research and education support services that will improve the efficiency, sustainability, and equity of the region's rice-based agri-food sector and help deliver the Sustainable Development Goals (SDGs).

CHALLENGES IN SOUTH ASIA

- Increasing population
- Rural to urban migration resulting in labor shortage and increased role of women in agriculture
- Fewer young people in farming
- Low incomes of many rice farming households
- Increasing economic inequality
- Need to improve resilience to climate change (droughts and floods)
- Poor nutrition of rice consumers



IRRI's strategy in South Asia



South Asia's decades-long partnership with IRRI has enabled the region's rice based agri-food sector to increase productivity and its resilience to environmental challenges. Working with Governments in the region IRRI will develop solutions and strategies to contribute to the UN's Sustainable Development Goals (SDGs).

Improved yields, climate resilience, and nutritional security. In collaboration with national governments, we will accelerate the dissemination of high-yielding and stress-tolerant rice varieties, as well as introduce healthier rice varieties to address micronutrient deficiencies e.g. zinc, iron and vitamin A.

Reducing the **environmental impact of rice production systems.** We will develop new practices to enhance the overall sustainability of rice production systems, such as reducing greenhouse gas emissions and health risks caused by burning of rice straw. Working with public and private sector partners, we will create viable business and technology models for using rice by-products such as husks and straw to provide renewable energy services in rural areas of South Asia.

Capacity building on rice-based agri-food systems. Through the IRRI South Asia Regional Centre (IRRI-SARC) at Varanasi we will enhance knowledge and training capacity at all levels as well as enabling technology transfer and adoption for South Asian and African nations.

Inclusion of women and youth. We will work with NARES, NGO, Civils Society Organizations (CSOs) and private sector partners to enhance the inclusion of women and youth in the rice value chain for safe, dignified and viable employment and entrepreneurial opportunities.

Scaling up innovations in rice value chains. We will work closely with private seed companies, millers, agricultural machinery manufacturers, and CSOs to scale up innovations in rice value chains. We will also partner with governments to promote and accelerate expansion and dissemination of improved varieties, research technologies, and packages of science-based best practices.

Engaging with governments and policy. We will facilitate high-level policy dialogues with global stakeholders in research and development, national investors from national and state/provincial agricultural ministries, NGOs and CSOs to help set the agricultural research and development agenda for the region.

Working with the private sector. With the increasing commercialization of agriculture in South Asia, we will strengthen our engagement with the private sector as a vehicle for delivering our mission in South Asia.

Multi-sectoral partnerships to achieve UN SDGs. We will work closely with the South Asian Association for Regional Cooperation (SAARC), Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC), national governments in South Asia, and international funding agencies to focus on ending hunger, poverty, ensuring gender equity, and improving the quality of life of the South Asian population. With our decades-long partnership with NARES and other stakeholders in South Asia, we are in a unique position to leverage these relationships to help deliver these goals.

IRRI in Africa



Africa has the highest reserves of untapped natural resources for food production, especially water and land. Over 130 million hectares in inland valleys are suitable for rice production, but only about 10 million are currently being used. Africa can substantially boost its food production, especially for smallholder farmers, if the region develops agri-food systems that are productive and resilient, providing balanced nutrition especially for women and children.

Our efforts in the region are geared towards contributing to food and nutrition security, and economic growth through innovative science, sustainable agri-food systems, and transformative partnerships. We focus on developing and deploying high-yielding and locally-adapted rice varieties and context-suitable best management practices. These efforts aim to curb reliance on rice imports and will significantly contribute to *Boosting Africa's rice sector*, an Africa-wide rice development strategy.

CHALLENGES IN AFRICA

- Unreliable water sources in a region where rainfed farming still dominates rice production systems
- Low-yielding and less adapted rice varieties susceptible to pests and diseases and sensitive to adverse weather and soil conditions
- Traditional production and processing systems
- Lack of affordable agrochemicals specially fertilizers
- Insufficient local agricultural policies to enable significant shifts
- Climate change resulting in extreme drought
- Labor shortage more women engaged in farming
- Limited opportunities for women and Youth
- Inadequate post-harvest management practices and storage
- Lack of good market opportunities



IRRI's strategy in **Africa**



Our current focus is in four countries, Kenya, Burundi, Mozambique and Tanzania. However, as our capacity increases in the region, we expect to extend our support to all rice-producing countries in Africa through our collaboration with AfricaRice and other organizations.

Climate-smart rice varieties. In collaboration with AfricaRice and national partners, we released 15 climate-smart rice varieties in several African countries. These varieties are more resilient and will reduce risks of crop failures and significantly enhance productivity. We also initiated system-based improvements through good agronomy, mechanization, postharvest and value addition, including better processing, packaging, branding and marketing.

Rice policy and systems. We will enable the development of strategic and effective seed systems by strengthening the private sector role and catalyzing enabling policies for engagement. These policies should facilitate faster varietal replacement and formal seed systems to provide high quality seeds, availability of inputs (especially fertilizers and other agrochemicals), and credit and marketing channels to support the growth of the African rice sector.

Research and delivery targets. Modern breeding approaches will be employed to facilitate faster development of tailored rice varieties, with broader adaptation and shorter durations for intensive systems. Developing resilient varieties with high yield and quality will encourage farmers to invest in inputs and take better care of their crops, with the target of doubling productivity.

Productive and profitable agri-food systems. Management strategies need to be developed to maximize the potential of the new varieties within efficient and sustainable production systems that optimize resource use and augment farmers' revenues. Considerable gains could be made by replacing the current traditional systems with modern agronomic principles and practices. Bringing in new crops and vegetables will improve nutrition and income.

Building effective seed systems. Seed systems need to be built and strengthened, allowing improved rice varieties to be accessed by farmers in a timely manner. Public sector is relatively weak compared with Asia, wherein the role of private sector becomes indispensable. Strengthening the private sector's capacity and engagement could also facilitate provision of fertilizers and other agrochemicals.

Capacity strengthening across the value chain. Unlike Asia, rice is relatively young in Africa, and only recently it became a priority crop. Enhancing the capacity for rice research is therefore indispensable for rice sector development. A critical mass of post graduate researchers is needed to lead local activities of partners, including private sector and NGOs. Technical staff could be trained through short-term hands-on courses to fill in the current gaps in expertise.

Adoption of innovation. Efforts are ongoing to integrate rice industry innovations into the local rice value chain, through partnerships, education, and technology development and transfer, to maximize impact and produce substantive benefits for rice farmers, producers, and consumers.

irri.org



International Rice Research Institute

IRRI aims to improve livelihoods and nutrition, abolishing poverty, hunger, and malnutrition among those who depend on rice-based agri-food systems. In doing so, IRRI's work protects the health of rice farmers and consumers, and the environmental sustainability of rice farming in a world challenged by climate change. IRRI's work promotes the empowerment of women and supports opportunities for youth in an equitable agri-food system.