



Rice science for a better world

Strengthening the breeding pipeline

Transforming Rice Breeding

Improved rice varieties have helped farmers provide a steady supply of rice to about 3.5 billion people who depend on rice for food. Breeding a new rice variety typically takes 8–9 years. However, with the world's food produced and grown under changing climate conditions, depleting resources, and increasing population, the process by which improved varieties are developed and released needs to go faster.

IRRI is restructuring its overall breeding operations through Transforming Rice Breeding (TRB), a project that will make the irrigated breeding pipelines more efficient and targeted.

Objective 1: Market research and market segmentation to guide rice breeding priorities

IRRI's new variety development pipelines have been structured to ensure that IRRI breeders develop products that meet the demands of rice producers and consumers. Environments in which rice is grown today and will be grown in the future are being quantified and characterized. The demographic segments of rice consumers across a broad range of cultural and economic conditions are also being studied as an important consideration in the breeding agenda.

Objective 2: Establishment and management of centralized cross-cutting breeding processes

Core breeding activities are being centralized into cross-cutting processes and services. This includes modernizing hybridization and crossing programs (hybridization services), using an industrial-scale rapid generation advance (RGA) system, centralizing rapid screening of major abiotic stresses toward the establishment of the abiotic stress tolerance evaluation center (ASTECC), enhancing disease and insect resistance systems through hotspot screening and establishment of the biotic stress resistance evaluation center (BSREC); upgrading and

implementing high-throughput marker genotyping (Genotyping Services Laboratory); establishing a new breeding information management system (Breeding4Rice); and centralizing foundation and breeder seed production.

Objective 3: Transforming IRRI's irrigated breeding program

IRRI's irrigated breeding program is being redesigned to become more efficient and effective. Key changes include accelerating breeding line development using (RGA), establishing a revamped multilocation testing system for field trials, implementing new experimental designs and more advanced statistical methods for data analysis, implementing computerized systems for data collection, and using mechanization for field nurseries and trials.

Objective 4: Regionalized breeding material development and multi-environment trials (MET)

Two breeding hubs have been established—one in Hyderabad, India, and another in Bujumbura, Burundi—as varietal breeding pipelines for South Asia (SA) and Eastern and Southern Africa (ESA), respectively. IRRI headquarters in the Philippines is the hub for varietal improvement for Southeast Asia (SEA). Establishment of breeding hubs and relocating breeding activities to these regional centers will ensure that breeding is more focused on regional and local market needs. The MET international network of various varietal development pipelines for Asia and Africa is also being revitalized to support the production of stable and adaptable rice varieties.

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