

Unleashing the force

by Savitri Mohapatra

The Africa Rice Breeding Task Force responds to the call for an improved research and extension capacity on the continent through a collaborative approach to rice breeding

Rice breeders in sub-Saharan Africa (SSA) are an endangered species, according to Dr. Moussa Sié, Africa Rice Center (AfricaRice) senior scientist. “Since classical plant breeding is no longer fashionable, very few students are taking up this discipline,” he remarked. “Even the handful of rice breeders who are working in national programs today are generally above 45 years old.”

A survey, which was conducted among AfricaRice’s member countries, verifies his observation. It showed that even a country the size of Nigeria has only two rice breeders. “Africa needs trained rice breeders—most African countries have none,” said Kofi Annan, chair of the Alliance for a Green Revolution in Africa, pointing out the lack of national capacity in rice breeding.

Drawing attention to the desperate lack of research and extension capacity, which threatens to impede the progress in developing Africa’s rice sector, participants of the Second Africa Rice Congress, held in March 2010, urged African governments and their partners to substantially strengthen the training and retention of new staff.

The Congress also called for the revival of the successful Task Force approach, introduced by AfricaRice in the 1990s. The Task Force consists of an Africa-wide collective research for development effort on critical thematic areas in the rice sector, based on the principles of sustainability, buildup



SOME MEMBERS of the Africa Rice Breeding Task Force team (from left to right): Ms. Bernice Bancole, laboratory technician; Mr. Abdoulaye Sow, agronomist; Dr. Mamadou MBare Coulibaly, chair; Breeding Task Force; Dr. Jimmy Lamo, vice-chair, Breeding Task Force, and Dr. Moussa Sié, coordinator, Breeding Task Force.

of critical mass, and ownership by the national agricultural research systems (NARS).

The Africa Rice Breeding Task Force

In response to this call, the Africa Rice Breeding Task Force was launched in June 2010 to regroup scarce human resources devoted to rice breeding in Africa and help build a new generation of rice breeders across the continent.

The main thrust of the Breeding Task Force is to adopt a systematic collaborative approach to rice breeding

that will build much-needed rice breeding capacity, facilitate access of African rice breeders to new materials, stimulate rice germplasm evaluation across the continent, and, in general, shorten the time needed to deploy new climate-resilient and stress-tolerant rice varieties for major production systems in SSA.

“The international agricultural research centers (IARCs) cannot do this alone nor can the NARS,” said Dr. Sié, who is the overall coordinator of this Task Force, which is supported by the joint IRRI-AfricaRice Japan-funded breeding project.

Dr. Sié described the Breeding Task Force as a partnership of rice breeders from NARS and IARCs in Africa, which will provide synergy to breeding efforts across the continent, thereby increasing impact. To enhance communication and collaboration among all the partners of the Breeding Task Force, a dedicated Web site has been developed. (See www.africarice.org/afribreed/)

The scope of the “force”

The Breeding Task Force covers mainly the four mega-environments in SSA—the rainfed lowland, irrigated, upland, and high-elevation ecologies. The challenges in these mega-environments are many and breeders must be able to tackle these challenges through improvements in productivity, stability and adaptability and grain quality of rice.

Responsibilities for the different mega-environments have been divided

among AfricaRice and IRRI breeders based in Africa, who work closely with their NARS colleagues.

The main thrust of the Breeding Task Force consists of a 3-phase evaluation of rice breeding lines from IARCs and NARS, starting from the regional trial, then national trials, and participatory varietal selection trials (a rice garden followed by 2 years of mother/baby trials). These trials are done in multiple locations in different countries (please see the map of Africa Rice Breeding Task Force trial sites).

The International Network for the Genetic Evaluation of Rice (INGER)-Africa plays a key role in the multiplication and distribution of new seed for in-country hotspot testing and participatory varietal testing trials and genotype-environment analyses.

Takashi Kumashiro, regional theme leader of GRiSP Themes 1¹ and 2² and leader of the AfricaRice Program on Genetic Diversity and Improvement, explained that one of the unique features of such an approach is that the breeding lines that enter the Task Force are provided by not one but many institutes such as NARS in Africa as well as IRRI, the International Center for Tropical Agriculture (CIAT), and AfricaRice.

For example, in 2011, the breeding lines nominated for the lowland regional trial consisted of 13% lines from the NARS, 34% from AfricaRice, 14% from IRRI, and 39% from CIAT.

The Task Force thus enables the evaluation of many breeding lines with prior data on performance from different sources under different biophysical and socioeconomic

conditions. “This feature is a bit like the Olympic Games,” Dr. Kumashiro said.

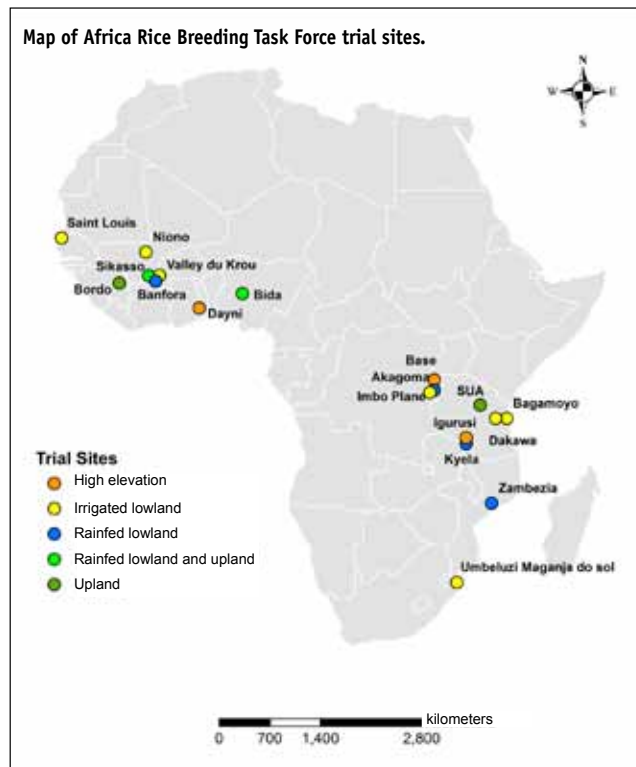
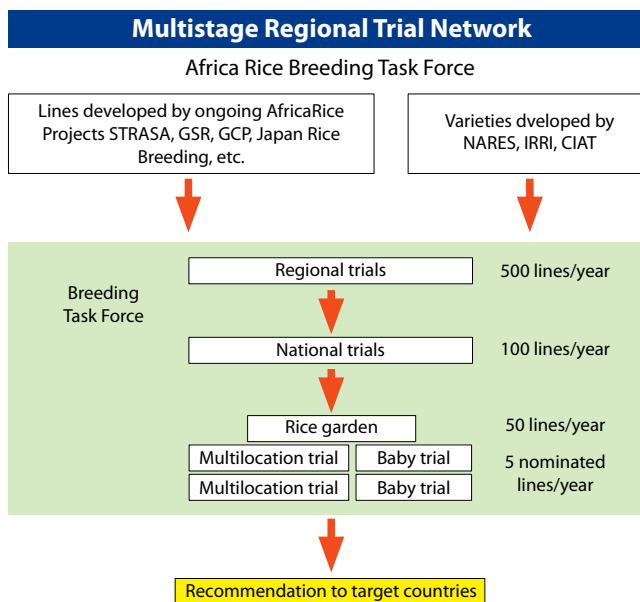
The second unique feature is that the breeding lines will be cultivated at many sites and exposed to not just a few but many breeders from different institutes. The multiyear and multilocation trials

are expected to enhance the quality of evaluation.

This will result in increased credibility on recommended varieties as well as credibility of data accumulated. “We expect that this will shorten the time lag between the completion of breeding and the official approval for varietal release,” Dr. Kumashiro stated.

Training programs for breeding, experimental design, and germplasm database management have been organized to upgrade the skills of rice researchers, including a training course held at IRRI in October 2010 for rice breeders from various Asian and African countries as well as a training workshop organized by AfricaRice in December 2010 to introduce the principles and new concepts of the experimental planning for plant breeding.

The Task Force will also support MSc and PhD students, and link up with Global Rice Science Scholarships (GRiSS) and other types of scholarships.



Spotting the champions

The key to the success of the Africa Rice Breeding Task Force will be timely and quality data collection, management, and interpretation for sound decisions on moving germplasm forward in the various trials, according to Dr. Kumashiro. “If that is done well, smart $G \times E$ (genotype by environment) analyses will enable us to select promising breeding lines to proceed to the next phase, that is, spot potential ‘Olympic champions’ early.” Hopefully, these “Olympic champions” will help remove some barriers toward improved quality and quantity of rice production on the continent and put Africa on the map of potential sources of rice food security in the world. 🍚

¹ Theme 1: Harnessing genetic diversity to chart new productivity, quality, and health horizons.

² Theme 2: Accelerating the development, delivery, and adoption of improved rice varieties.