Rice seeds making a difference in Africa

The rice of hope. In Mali, women inspect a lush crop of NERICA 4 in a local farmer's field. High-yielding NERICA varieties have made it possible for many farmers in West and Central Africa to reap bountiful rice harvests.

AfricaRice (3)

*The New Rice for Africa (NERICA) families of varieties came from crosses between African rice (*Oryza glaberrima*) and Asian rice (*Oryza sativa*). A total of 18 upland NERICA and 60 lowland NERICA-L varieties are available. These varieties are making rapid headway in sub-Saharan Africa to the benefit of Africa's rice producers and consumers.*

Despite Africa's abundant land and water resources, producing enough food for the hundreds of millions of people that rely on rice as the primary source of food energy and protein in their diet has always been a huge challenge.

But, in recent years, farmers in West and Central Africa are benefiting from sufficient rice harvests to feed their families and sell in markets as well.

At the center of this is NERICA. NERICA is synonymous with the work that earned AfricaRice (formerly West Africa Rice Development Association) the King Baudouin award in 2000, and Monty Jones the prestigious World Food Prize in 2004. There are two types of NERICA varieties: 18 upland NERICAs, pioneered by Dr. Jones, and 60 lowland NERICAs (NERICA-L), adapted for both rainfed and irrigated lowlands, developed later by Moussa Sié and national partners, and which earned Dr. Sié the Fukui International Koshihikari Rice Prize from Japan in 2006.

African Rice Initiative

AfricaRice and its partners launched the African Rice Initiative (ARI) in 2002 to provide African farmers with greater access to NERICA and other improved varieties.

In 2005, the Initiative launched a Multinational NERICA Rice Dissemination Project with funding from the African Development Bank, European Union, Japan, and ARI. The project sought to widely disseminate NERICA and other improved varieties among rice farmers in Benin, Gambia, Ghana, Guinea, Mali, Nigeria, and Sierra Leone to upgrade production, reduce poverty, and ensure food security.

Farmers know best

AfricaRice recognized ARI as the first real platform to accurately assess the impact of the new varieties. One approach adopted by ARI to accelerate NERICA dissemination was participatory varietal selection (PVS). Farmers select potential new varieties over a period of 3–5 years, with responsibility for the trials moving progressively from researchers to extension agents to the farmers themselves.

Starting with 91 lines, PVS has resulted in each of the 18 named upland NERICA varieties being released or adopted in at least one sub-Saharan African country. In addition, 21 lowland NERICA-type varieties have been adopted in one or more sub-Saharan African countries, including 14 designated NERICA-L varieties (the others have yet to be given "official" designations). Quite a few non-NERICA varieties were also adopted through the ARI effort.

Strategic stockpile

"Since the early days of NERICA's success, demand for seed has always outstripped supply," says ARI coordinator Inoussa Akintayo. Thus, a major goal of the NERICA dissemination project was to strengthen the capacity of national seed systems to deliver, or at least expedite the delivery of, certified seed of the required varieties to the farmers.

A bountiful field of NERICA rice in Liberia.

"ARI provided breeder and foundation seeds, and helped the national systems to produce additional foundation and certified seed," Dr. Akintayo says. "Over its life span, ARI and the national systems have produced more than 295 tons of breeder and foundation seed of NERICA, NERICA-L, and other improved varieties."

Given the difficulty of establishing seed certification schemes in large countries, especially in rural areas, AfricaRice developed community-based seed systems (CBSS) in the late 1990s, whereby farmers were trained in best practices for producing "seed of acceptable quality" on-farm for themselves and their neighbors. CBSS was adopted by ARI alongside formal seed delivery services, especially in areas where modern varieties had been adopted through PVS in the years leading up to the NERICA dissemination project. In many cases, the bottleneck to fur-

ther adoption and diffusion to neighboring farmers and communities was simply an inadequate supply of seed.

Looking at the bigger picture

Adoption in and of itself does not constitute impact on the things that matter, such as poverty and well-being. "That is why we looked carefully at socioeconomic indicators," says Aliou Diagne, leader of the AfricaRice Policy, Innovation Systems, and Impact Assessment program.

"Because we looked at both project and nonproject villages and households," Dr. Diagne continues, "we were able to estimate impact on a much broader scale than just for the project participants and those who were questioned. It is these figures that give an indication of the true picture."

Reaping the rewards

In 2011, farmers who had participated in the project activities benefited from additional income of US$14.4 million, while the spinoff to nonparticipant farmers was estimated at $28.7 million—a total of $43.1 million.

These benefits accrued from a combination of increased yield and increased area of rice. The overall average yield increase was 0.42 ton per hectare, a significant jump for a crop that averages just 1 ton per hectare across the continent (upland rice). Individual farmers' total production increased by an average of 0.81 ton.

A highly conservative estimate of the extent of NERICA production throughout sub-Saharan Africa in 2011 is 700,000 hectares, but the true figure is likely to be closer to a million hectares. (A 2010 survey suggested that over half a million hectares of NERICA varieties were grown in 2009 in the seven ARI target countries alone.)

"However, the important impact of any agricultural development activity relates to poverty," says Dr. Diagne. "By the end of the project, we estimate that more than 35,000 people living in participating rice-farming households had been lifted out of poverty on the basis of a $1.25 per day poverty line.

"If we project this figure to 2035, taking into consideration current awareness, seed availability, and adoption levels, we are looking at well in excess of half a million people lifted out of poverty as a result of this project," he concludes. While ARI focused on West and Central Africa, the NERICA and NERICA-L varieties are also making headway in East Africa, especially in Ethiopia and Uganda.

NERICA 4 makes a difference

Bakary Togola from Mali had to leave school at an early age to take up farming and support his family.

He began to grow rice in 1984, 10 years before the first NERICA varieties were tested in farmers' fields. Mr. Togola was typical of the 20 million rice farmers in West Africa who had only a few varieties to choose from for planting. Asian rice was not tough enough to compete with the weeds and the environmental conditions of the land. For many, cultivating traditional African rice was not worthwhile because it did not produce enough.

In 2003, Mr. Togola had the opportunity to adopt NERICA 4 on an area of less than 1 hectare. By 2008, he was reaping more than 4.7 tons per hectare and sold 300 tons of NERICA 4 seeds to the Malian government during the rice crisis. In 2011, he planted 250 hectares of upland rice.

His rice farm has become so profitable that he was able to contribute funds towards improving a 15-kilometer road leading to his farm.

Although Mr. Togola's achievements with NERICA varieties are well beyond the average for farmers participating in the ARI dissemination project, AfricaRice hopes that more farmers like him will be inspired to take up the challenge of expanding their rice production.

The widespread adoption of NERICA varieties goes beyond higher rice production and lower rice imports, according to AfricaRice. It will make a major difference in the lives of farmers by putting more money in their pockets, and in the lives of poor rice consumers by placing more affordable food on their tables. This is how NERICA varieties can make a difference in the lives of African rice farmers, leading to greater food security and reduced poverty across the continent.