In a large portion of West Africa, rice is the staple—demand has risen at about 5 percent annually since 1970 among various populations and across income groups. The average small farmer grows rice on half of his or her 2 to 3 hectares of land to feed 13 to 15 family members. With rice yields decreasing and demand increasing, however, there is a chronic shortage—annual imports currently exceed $1 billion for the region.

To address these challenges, the West Africa Rice Development Association (WARDA) in 1992 initiated research programs aimed at developing improved rice varieties with superior performance characteristics. The NERICA (new rice for Africa) program set out to combine the ruggedness of African rice with the productivity of Asian species. All efforts to combine their best genetic traits had failed, until now.

“New technologies in rice-based cropping systems are yielding 25 to 250 percent production gains,” says Eugene Terry, RDV’s Agricultural Research and Crops Adviser, and former Director General of WARDA. “These new improved varieties promise to increase land and labor productivity of rice producers in the sub-region in a dramatic and sustainable way.”

WARDA used molecular biology to overcome sterility, the main problem in crossing the species, and to speed the breeding process. With conventional breeding, the progeny provide large numbers of different plant types. Without biotechnological interventions, it takes five to seven generations to isolate and purify, and select a line with the desired combination of genetic traits. This cycle has been significantly shortened through the innovative breeding technique used by the WARDA scientists. By the mid-1990s, WARDA scientists were testing NERICAs in rain-fed conditions, with the key cooperation of farmers.
PVS activities are currently ongoing in 17 West and Central African countries.

Guinea has been the setting for the majority of NERICA progress. By 1997, some 116 farmers in eight prefectures had completed the on-farm trials using three new varieties each. By 2000, the use of the technology had exploded among small-scale farmers, with twenty thousand farmers growing NERICA on 5000 acres.

“At this stage in Guinea,” says Amadou Moustapha Beye, WARDA technology transfer agronomist, “we’re developing a network. The whole system from technology generation through seed production, paddy production, rice processing and milling to rice marketing, are all being used to upgrade the rice-based production system in the country.”

Both the hybrid technology and the network are addressing agricultural sustainability issues as well. About 40 percent of West Africa’s 4.1 million hectares of rice is grown like maize under upland, rain-fed conditions, and about 80 percent of this is slash-and-burn agriculture. Each crop grown after a slash-and-burn cycle produces less than the previous harvest—stressing an already fragile ecosystem, and driving up demand for rice imports.

Some of the new hybrid varieties of upland rice mature in only three months, allowing for planting of a second crop or a leguminous cover crop to improve soil fertility. This makes it possible to plant rice for more than one year before returning land to fallow, reducing slash-and-burn agriculture. It also provides food during the difficult “hungry” season when rain is infrequent.

The benefits of the hybrid rice are numerous. NERICA combines the resistance of the African parent to pests, diseases and water stress with the yield potential of the Asian parent; it reduces weeding requirements and tastes good, say the farmers. The new hybrid displays both drought and acid-soil tolerance. Over 70 percent show an even higher protein content than the African and Asian parents.

“Barring unforeseen difficulties,” says Hans Binswanger, Sector Director of Rural Development and the Environment, “we anticipate a rapid growth of rice production, leading to self-sufficiency within three or four years. We expect improved incomes and nutrition for the rural population and more affordable domestic rice for the urban population.”

The challenge now is to exploit and disseminate this technology through the consolidation of a unified consortium. The plan is to create a network of participating institutions to promote the technology and build capacity. To this point, only small-scale farmers have adopted the technology. The anticipated benefits in terms of living standards depend on the development of a comprehensive approach to extend the use of NERICA to more small farmers and large farmers throughout the region.

The UNDP and the World Bank are meeting with WARDA to consider next steps to scale-up and disseminate an important technology, and build capacity in a growing network. USAID is expected to cooperate, and the continuing involvement of research institutes and foundations remains key to progress.

Joining WARDA in the NERICA program, partners have included the University of Tokyo, the Japan International Research Center for Agricultural Science, the Institute for Research and Development (France), Cornell University (USA), the Yunnan Academy of Agricultural Science (China), the National Agricultural Research Systems (Africa), and several affiliates of the Consultative Group on International Agricultural Research (CGIAR): the International Center for Tropical Agriculture and the International Rice Research Institute. The Rockefeller Foundation also funded biotechnology-aided breeding approaches that increased the efficiency of WARDA’s scientists.

New Rice for Africa is a publication of the Sustainable Land Resources Management thematic group of the World Bank. It was conceived, written and designed by Dorst Mediaworks (www.dorstmediaworks.com). It is based on internal Bank documents and WARDA publications. Any questions? Please contact Eugene Terry at eterry@worldbank.org.