Africa MAIZE STRESS

Project: Tough New Maize for Smale-Scale Farmers

The Africa Maize Stress (AMS) Project delivers seed and knowledge that help maize farmers across Africa overcome some of their worst problems. For many of these farmers, a lost maize crop represents hunger and lost livelihoods. In East Africa, maize dominates the diets of rural and urban poor. Per capita consumption ranges from nearly 30 kg/year in Uganda to over 120 kg/year in Tanzania, providing a major portion of calories. Demand for maize in West and Central Africa is increasing rapidly; in many savanna areas maize has replaced traditional cereals and serves as both a food and cash crop.

Throughout sub-Saharan Africa, maize farmers often struggle against a host of constraints. Drought periodically devastates crops in East Africa and in the Sudan savanna of West Africa. Impoverished soils choke maize crops throughout sub-Saharan Africa, but soils in the moist savannas of West and Central Africa are especially infertile. As land use intensifies, weeds compete more aggressively with maize for scarce nutrients and water. Finally, insect pests and the parasitic plant *Striga* reduce harvests region-wide.

Focusing on Farmers' Needs

In 1998, CIMMYT (the International Maize and Wheat Improvement Center) and IITA (the International Institute for Tropical Africa) began working with numerous partners to develop and promote stress-tolerant maize for resource-poor farmers in West, Central, and East Africa. Combining breeding with crop management research and involving farmers, the project "Developing and Disseminating Stress-Tolerant Maize for Food Security in East, West and Central Africa" has met or exceeded all benchmarks. On the basis of its achievements, a panel of internationally recognized experts strongly recommended that the project, which is informally called the "Africa Maize Stress Project," receive continued financial and technical support.

AMS Achievements: Tough Maize for Trying Conditions

- **New materials:** Local breeding programs are stronger thanks to an influx of thousands of promising, stress-tolerant varieties from the project. New experimental maize yields 5 times more than the best commercial varieties and 10 times more than susceptible maize under *Striga* infestation. Other varieties mature as quickly as Katumani—the regional standard for earliness (a trait much valued by farmers in dry, multicrop settings)—but yield more under drought stress. *Some hold up under not just one but several of the region's constraints.*

(more→)

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- **New methods:** Regional scientist now use certain plant characteristics to identify hardy plants among thousands of experimental varieties in the field. Cheaply and easily measured, these traits include more synchronous flowering (indicating a plant's tolerance to drought and low nitrogen), root-pulling strength (indicating tolerance to low nitrogen), and *Fusarium* resistance (indicating *Striga* tolerance).
- **A direct connection to farmers:** Through a novel approach known as "mother-baby trials," more than 1,000 smallholder farmers at dozens of sites are comparing AMS Project varieties with popular and locally grown cultivars. The farmers give systematic feedback to researchers and obtain seed of the varieties they like best. This direct link helps farmers to obtain the seed and knowledge they need.
- **Better research sites:** At 18 sites in 11 countries (see map), AMS researchers can now apply constraints uniformly and at controlled levels to experimental varieties, allowing effective selection of the most stress-resistant ones.
- **Knowledge:** Some 350 maize scientists have benefited from capacity building activities.
- **Strength through partnership:** The AMS Project improved linkages between national maize programs in the region and strengthened regional networks: the East and Central Africa Maize and Wheat Network (ECAMAW), the Association for Strengthening Agricultural Research in East and Central Africa (ASARECA), and the West and Central Africa Maize Network of SAFGRAD (WECAMAN).

The AMS Project should also help farmers cope with the potentially disastrous effects of climate change. By using advanced crop models, researcher can identify the zones most vulnerable to climate change and identify ways for farmers to adapt. Researchers can also use models to discard cropping practices that will become risky for farmers under different climate change scenarios. By developing plants that use water and soil nutrients more efficiently, the AMS Project helps farmers' crops survive despite increasingly erratic rainfall and helps reduce greenhouse gas emissions. These benefits will be enhanced through crop management practices that help farmers make the most of scarce water and soil nutrients. Finally, better maize seed and knowledge may help farmers to produce better crops from less land and leave tropical forests intact—thus preserving one of nature's best defenses against climate change.

Future Directions

If funding permits, AMS Project participants will build on their achievements in several important ways. To ensure that valuable new seed reaches all interested farmers, researchers will promote stress-tolerant maize with seed producers and establish community-based seed production of the best varieties. To improve the diets and livelihoods of farmers and consumers who depend heavily on maize, research will focus on developing and promoting stress-tolerant varieties of quality protein maize (QPM), which is already grown widely in Ghana.

Sources of funding for AMS

The UNDP Regional Bureau of Africa; the UNDP Sustainable Energy and Environment Division (SEED); the Swedish International Development Cooperation Agency (SiDA); and the International Fund for Agricultural Development (IFAD). National research programs in Africa also support the project with their own resources—a strong endorsement of its value.

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