

Quality Protein Maize

Targets Poorest in Africa



Across the rural households of Kenya, there is an oft quoted Swahili expression: *Bila mahindi, hakuna chakula*. Translation: Without maize, there is no food.

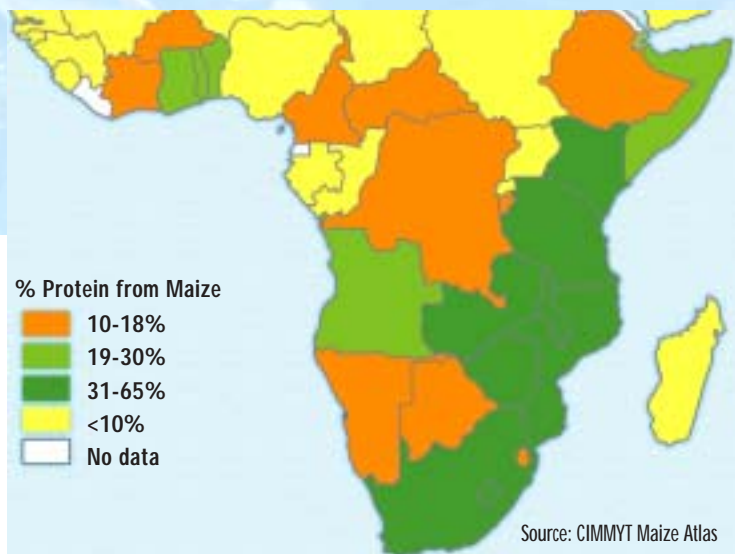
Maize is the staple food of millions across sub-Saharan Africa, particularly in eastern and southern Africa where per capita consumption in some countries, and certainly among the poor, exceeds 100 kg/yr. Estimates of malnutrition range from 30 to 50% of the population—mostly women and children. The maize-based diets in extremely poor areas lack complete proteins, vitamins, and important minerals, often leaving people disease-prone and unable to work, care for children, or take part in normal activities. Infants, following weaning, are particularly affected by protein deficiencies, which impede their physical and mental development.

Ideally, these impoverished populations would have access to a healthy diversity of vegetable and meat products to provide better nutrition. But the sad reality is that for many, maize remains their main food and source of protein (see Figure), and for some, during certain times of year, their only food. For these people, CIMMYT's Quality Protein Maize (QPM) may provide the best option for meeting their basic nutritional requirements.



In collaboration with SG2000, the World Food Program has started to disseminate QPM maize as part of its school and HIV feeding schemes in Uganda. If more widely adopted, this approach not only provides more nutritious food to those most in need, but also an income opportunity for many smallholder farmers to engage in contract production of QPM grain.

“The development of quality protein maize is people-centered science at its very best, providing better nutrition while fostering economic growth for the world’s poor.” — Ian Johnson, Chair of the CGIAR and Vice President for Environment and Sustainable Development at the World Bank



QPM offers tremendous potential for improved protein nutrition in maize-based diets. In absolute numbers, sub-Saharan Africa (SSA) trails only South Asia for the most cases of protein-energy malnutrition (PEM), and projections indicate the situation on the continent is worsening. Even in its mild-to-moderate form, PEM contributes to 56 percent of child deaths in 53 developing countries.

Persistence in Research Yields Results

Quality protein maize is the result of more than three decades of scientific endeavor. In 1963, scientists at Purdue University discovered the gene called *opaque-2*, which significantly increases the levels of two key amino acids, lysine and tryptophan, in maize. As noted in FAO's *Maize and Human Nutrition*, "the addition of 0.30 percent L-lysine and 0.10 percent L-tryptophan easily increases the protein quality of maize by 150 percent." Farmers, however, initially showed little interest in *opaque-2* maize because of its low yields, chalky-looking grain, and susceptibility to pests and diseases.

Starting in 1970, with funding from the United Nations Development Programme (UNDP), CIMMYT converted *opaque-2* maize into Quality Protein Maize (QPM), which has nearly double the lysine and tryptophan of normal maize, but is effectively indistinguishable from it. CIMMYT maize breeder Surinder K. Vasal and cereal chemist Evangelina Villegas shared the 2000 World Food Prize for their efforts in creating QPM.

QPM Development and Distribution

During the last decade, with support from Sasakawa Global 2000 (SG2000), the Nippon Foundation, and the Canadian International Development Agency (CIDA), CIMMYT has worked with partners to develop and promote QPM varieties, which now have been released to farmers in 25 developing countries. In Africa, 770 tons of certified seed has been produced in Uganda (2003), 160 tons in Ethiopia (2004), and 50 tons in Tanzania (2003). That is enough seed to plant 50,000 hectares. The trend line for production and deployment of certified QPM seed is increasing in these countries and in South Africa, Kenya, Malawi, and Mozambique.

CIMMYT's QPM program for eastern and southern Africa currently focuses on breeding drought tolerance and *Striga* resistance—two threats that particularly affect poor African maize farmers—into QPM varieties.

Collaboration with SG2000 and three complementary projects are especially crucial to the success of the current QPM work:

- The Nippon Foundation has been a strong supporter of QPM germplasm development, dissemination, and training focused on Africa. Three networks, WECAMAN (West and Central Africa Maize Network), ECAMAW (East and Central Africa Maize Network) and the SADC maize breeding network ensure transparency and regional ownership of QPM research activities and grant allocation to NARS in various sub-regions.
- The QPM-D project for East Africa, funded by CIDA has provided strong support to socioeconomic, nutrition, and QPM dissemination activities.
- The QPM project funded by the Rockefeller Foundation enables eastern and southern African national scientists to convert their preferred open pollinated varieties to QPM (19 widely-grown elite maize cultivars are in this program).

In addition, considerable opportunities for synergies exist between CIMMYT and the HarvestPlus Challenge Program, particularly related to nutritional advocacy and dissemination of nutritionally enhanced varieties.

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