WHAT THE WORLD EATS: MAIZE

Food security • Environment • Economic development • Climate change
What the World Eats:

MAIZE
– a sustainable strategy for food security

Recurrent food price crises—combined with the global financial meltdown, volatile energy prices, natural resource depletion, and climate change—threaten the livelihoods of millions of poor people.

Together with rice and wheat, maize provides at least 30% of the food calories of more than 4.5 billion people in 94 countries.

They include 900 million poor consumers for whom maize is the preferred staple, 120-140 million poor farm families and about one-third of all malnourished children.

Between now and 2050, the demand for maize in the developing world will double, and by 2025 maize will have become the crop with the greatest production globally and in the developing world.

But harvests at current levels of productivity growth will still fall short of demand and millions of farm families will remain in poverty. Unless vigorous measures are taken to accelerate yield growth, increase incomes from more productive, sustainable and resilient maize based systems, and give greater opportunities to women and young adults, the outcome will be less affordable food for millions of poor maize consumers, continuing poverty and childhood malnutrition, deforestation, soil degradation, reduced biodiversity, and accelerated depletion of water and fertilizer reserves.

“No Maize, No Food”
Rashid Said Mpinga, Farmer in Tanzania’s Morogoro District
Why Maize?

Ongoing poverty and inequity

Maize is currently produced on nearly 100 million hectares in 125 developing countries and is among the three most widely grown crops in 75 of those countries (FAOSTAT 2010; Figure 1). About 67% of the total maize production in the developing world comes from low and lower middle income countries; hence, maize plays an important role in the livelihoods of millions of poor farmers. They grow maize for food, feed, and income in 24 diverse and mostly rainfed farming systems, accounting for about 90% of the total maize area. They are often too poor to afford irrigation and are exposed to significant risks of production and income failure.

So it is not surprising that one-third of all malnourished children are found in systems where maize is among the top three crops (Hyman et al. 2008). Often with few other income opportunities than their farmstead, these farmers need options to increase and stabilize incomes from more productive, resilient and sustainable farming approaches that are adapted to future climates. Women play a significant role in maize production and maize-based systems. They need to be better involved in the design of appropriate interventions, and be given access to resources and information that allow them to improve their families’ livelihoods.
Converging Challenges

The combined challenges of increasing demand, continuing poverty and malnutrition, natural resource depletion and climate change will require the world to double the productivity and significantly increase incomes and livelihood opportunities from more productive, resilient and sustainable maize-based farming systems—employing essentially the same land area while contending with climate change and rising costs of fertilizer, water, and labor.

These challenges can only be met through a concerted effort of public and private sector partners that intrinsically involves target communities and national governments in designing appropriate solutions. Such an effort is an essential response to repeated calls for coordinated international action to achieve global food security and poverty reduction, such as the L’Aquila Joint Statement made in July 2009 by leaders of the world’s largest economies.

Well over 90% of resource poor maize farmers and consumers live in tropical and subtropical areas of Africa, Asia, and Latin America.
Targeting for Impact

The first target group for MAIZE worldwide is smallholders who live in stress-prone environments and who have poor market access (typically both factors go together).

This group includes an estimated 640 million poor people who live on USD 2 per day or less; 275 million are maize dependent and 72 million of those are malnourished children. The second target group comprises market-oriented smallholders in more favorable production areas and with great potential to supply markets but who lack access to appropriate technology. This group includes 470 million poor, of whom 367 million are maize dependent and among whom there are at least 49 million malnourished children. Beyond these target groups, there will be spill-over benefits to other farmers in developing countries.

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Our Strategy

The global strategy for MAIZE and food security will be led by CIMMYT and the International Institute of Tropical Agriculture (IITA). The strategy is designed to ensure that publicly-funded international agricultural research helps most effectively to double the productivity of maize-based farming systems, making them more resilient and sustainable and significantly increasing farmers’ incomes and livelihood opportunities, without using more land and as climates change and fertilizer, water, and labor costs rise. This strategy draws upon learning and experiences obtained through decades of extensive partnerships, feedback, successes, and challenges in work with national and international research and development partners, both public and private, and including many farming communities. It will also be enriched through new partnerships with institutions and individuals worldwide who share our commitment to reducing poverty and enhancing global food security and environmental sustainability.

We’ve identified nine areas (strategic initiatives) that can help turn the wheel on food security by addressing maize-based farming systems.

1. **Socioeconomics and policies for maize futures.** Increased effectiveness and positive impacts of maize research on food security, poverty reduction, gender equity, and the environment through better targeting of new technologies, policies, strategic analysis, and institutional innovations.

2. **Sustainable intensification and income opportunities for the poor.** Sustainable intensification and income opportunities in six maize-based farming systems where 315 million of the poorest and 22% of all malnourished children live.

3. **Smallholder precision agriculture.** Crop management advice and practices that allow 20 million information-constrained smallholders to close the maize yield gap, lower production costs, and reduce agriculture’s environmental footprint, especially through more efficient fertilizer use.

4. **Stress tolerant maize for the poorest.** Stress tolerant maize varieties that reduce hunger and production shortfalls for 90 million people as climates change and abiotic and biotic stresses become more frequent, widespread, and intense.

5. **Towards doubling maize productivity.** Public-private partnerships with the local seed sector and agro-industry to provide better adapted and diverse maize hybrids for smallholders in emerging markets, allowing them to produce enough maize grain to meet the daily requirements of 160 million consumers while strengthening the local breeding sector.

6. **Integrated postharvest management.** Integrated approaches to improve food safety and reduce post-harvest losses of grain.

7. **Nutritious maize.** Bio-fortified varieties that will allow heavy consumers of maize in 15 countries to attain healthy and nutritious diets and farmers to benefit from market opportunities.

8. **Seeds of discovery.** Cutting-edge research to open the “black box” of maize genetic diversity, permitting researchers to mobilize its full potential in breeding programs worldwide, especially for hard-to-solve problems related to climate change.

9. **New tools and methods for national institutions, entrepreneurs, and farmers.** Give small- and medium-scale public and private seed enterprises in developing countries the same tools as multinational ones, so that they can fill demand niches for smallholders.
All Strategic Initiatives include capacity building to empower a new generation of women and men scientists in the range of topics covered. The impact of these initiatives will be measured by ongoing monitoring and evaluation that include: Process Evaluation, Socioeconomic Analysis, Feedback from Beneficiaries and Partners, Process Monitoring, and Performance Assessment measured by specific indicators.

With a targeted annual budget of USD 61.2 million in 2011, rising to USD 97.8 million by 2013, MAIZE will increase the productivity of the target groups 7% by 2020 and 33% by 2030, adding an annual value of USD 2.0 billion by 2020 and 8.8 billion by 2030. It will reach 40 million smallholder farm family members by 2020 and 175 million by 2030, and provide enough maize to meet the annual food demand of an additional 135 million consumers by 2020 and 600 million by 2030.

A farmer who, through better seed, is able to grow more can suddenly afford to send his children to school instead of requiring them in the field.
Our Vision of SUCCESS

1. Increasing demands for food are met, and food prices are stabilized at levels that are affordable for poor consumers.

2. Farming systems are more sustainable and resilient, despite the impacts of climate, and their dependence on irrigation and increasingly expensive fertilizers is reduced.

3. Increased production in developing countries is achieved mainly through higher yields, thus lessening pressure on forests, hill slopes, and other crops.

4. Poverty and malnutrition are reduced, especially among women and children, and a greater proportion of women and young adults are able to engage in profitable and environmentally-friendly farming.

5. Developing countries are able to compete more vigorously in export markets and ensure benefits for a wide range of actors in the value chain of major food crops.

6. Disadvantaged farmers and countries gain better access to cutting-edge proprietary technologies through innovative partnerships, in particular with advanced research institutes and the private sector.

7. A new generation of scientists and other professionals is guiding national agricultural research across the developing world and working in partnership with the CGIAR, the private sector, policy makers and other stakeholders to enhance efficiency and impact.
Humankind faces tremendous challenges to food security and environmental degradation that will worsen if no measures are taken. Given the time needed to create the improvements described, we must act now so that poverty and hunger can be reduced, human health and nutrition improved, and better care taken of resources to support future generations.

**MAIZE partners**

### National agricultural research institutes

- Angola, Instituto de Investigação Agronomica (IIA)
- Argentina, Instituto Nacional de Tecnología Agropecuaria (INTA)
- Azerbaijan, Institute of Genetic Resources
- Bangladesh, Bangladesh Academy for Rural Development
- Bangladesh, Agricultural Research Council (BARC)
- Bangladesh, Rangpur-Dinajpur Rural Services
- Bangladesh, Bangladesh Agricultural Research Institute (BARI)
- Bangladesh, Bangladesh Rice Research Institute
- Benin, Institut National de Recherche Agronomique du Benin (INRAB)
- Bolivia, CIF
- Botswana, Department Agricultural Research
- Bulgaria, Miniatura of Plant Genetic Resources “K. Malkov”
- Burkina Faso, Equipe de Recherche du Burkina Faso (INERA)
- Burkina Faso, Institut de l’Environnement et de Recherches Agricoles (INERA)
- Burkina Faso, Ministère de l’Agriculture
- Burundi, Institut des Sciences Agronomiques du Burundi (ISABU)
- Cameroon, Chers Agriculteurs pour le Développement
- Chad, Institut Chadien de Recherches Agricoles pour le Développement
- China, Chinese Academy of Agricultural Science
- China, Guangxi Academy of Agricultural Science
- China, Guizhou Academy of Agricultural Science
- China, Sichuan Academy of Agricultural Sciences
- China, Yunnan Academy of Agricultural Sciences
- Colombia, Corporación Colombiana de Investigación Agropecuaria (CORPOICA)
- Costa Rica, Instituto Nacional de Innovación Tecnológica en Agricultura (INTA)
- D.R. Congo, Institut National Pour l’Etude et la Recherche Agronomique
- D.R. Congo, N’Sega Lutang’a Farm
- DPR Korea, Crop Genetic Resources Institute
- El Salvador, Centro Nacional de Tecnologia Agropecuaria y Forestal (CENTA)
- Ethiopia, Ethiopia Institute of Agricultural Research (EIAR)
- Ethiopia, Ethiopian Seed Enterprise
- Ethiopia, Ethiopian Health and Nutrition Research Institute (EHNRI)
- Ethiopia, Ministry of Agriculture and Rural Development (MoARD)
- Ethiopia, Oromia Seed Enterprise (OSE)
- Georgia, Georgian Institute of Farming, Field Crops PGR
- Ghana, Council for Scientific and Industrial Research (CSIR)
- Ghana, Crop Research Institute (CRI)
- Ghana, Ghana Grains and Legumes Development Board
- Ghana, Ministry of Food and Agriculture
- Ghana, Savannah Agricultural Research Institute (SARI)
- Guatemala, Instituto de Ciencia y Tecnología Agropecuaria (ICTA)
- Guinea, Institut de Recherches Agronomique de Guinée
- HONDURAS, Dirección de Ciencia y Tecnología Agrícola (DICTA)
- Honduras, EAPEZ
- India, Directorate of Maize Research (DMR)
- India, WB Department of Agriculture
- India, Indian Council of Agricultural Research (ICAR)
- India, Indian Agricultural Research Institute
- Indonesia, Indonesian Center for Agricultural Biotechnology and Genetic Resources Research and Development (ICABI Biograd), Indonesia
- Indonesia, Indonesian Center for Food Crops Research for development (ICFORD)
- Iran, Agricultural Engineering Research Institute (AERI)
- Iran, Agricultural Research, Education and Extension Organization (AREEO)
- Iran, Dryland Agricultural Research Institute (DARI)
- Iraq, Iranian Research Institute for Plant Protection (IRIPP)
- Iran, Seed and Plant Improvement Institute (SPIR)
- Iran, Soil and Water Research Institute (SWRI)
- Ivory Coast, Centre National de Recherche Agronomique
- Ivory Coast, Fonds Interprofessionnel Pour La Recherche et le conseil Agricoles
- Kazakhstan, Institute of Agriculture
- Kenya, Kenya Agricultural Research Institute (KARI)
- Kenya, Kenya National Biosafety Authority
- Kenya, Kenya Plant Health Inspectorate Service (KEPHIS)
- Lesotho, Department of Agriculture Research
- Lesotho, Ministry of Agriculture and Food Security
- Malawi, Department of Agriculture Extension
- Malawi, Department of Agricultural Research Services
- Malawi, Ministry of Agriculture
- Mali, Institut d’Économie Rurale (IER)
- Mexico, Centro de Investigación y de Estudios Avanzados del Instituto Politécnico Nacional (CINVESTAV)
- Mexico, Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias (INAFAP)
- Mexico, FIRA
- Mexico, Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación
- Mexico, Universidad Autónoma Metropolitana (UAM)
- Mozambique, CLUSA
- Mozambique, Instituto de Investigação Agrária de Moçambique (IIAM)
- Mozambique, Instituto Superior Politécnico de Moçambique (ISI)
- Mozambique, Instituto Superior Politécnico de Manica
- Nepal, Agriculture Botany Division, Nepal Agricultural Research Institute
- Nepal, Nepal Agricultural Research Council (NARC) including the National Maize Research Program
- Nicaragua, Instituto Nicaragüense de Tecnología Agropecuaria (INTA)
- Nigeria, Agriculture Department of Bwari Area Council
- Nigeria, Institute of Agricultural Research (IAR)
- Nigeria, National Agency for Food and Drug Administration and Control (NAFDAC)
- Nigeria, National Agricultural Sample Census Pilot (NASC)
- Nigeria, National Agricultural Extension, Research and Liaison Services (NAERLS)
- Nigeria, National Center for Genetic Resources & Biotechnology
- Pakistan, Mais and Millet Research Institute
- Panama, Instituto de Investigación Agropecuaria de Panamá (IDAP)
- Paraguay, Centro Regional de Investigación Agrícola (CRIA)
- Peru, Instituto Nacional de Innovación Agraria (INIA)
- Peru, Ministry of Agriculture
- Philippines, Institute of Plant Breeding (PCARRD)
- Russia, Vavilov Institute of Research
- Rwanda, Institut des Sciences Agronomiques du Rwanda (ISAR)
- Senegal, Fondation Agir pour l’Éducation et la Santé (FAES)
- Senegal, Institut Senegalais de Recherches Agricoles
- Senegal, Plant Protection and Quarantine Services (SPV)
- Senegal, Université de ThIES

The circle is not closed. Join us and contribute to this historic effort to stabilize maize prices, improve farmers’ incomes and lives, and save natural resources.
Regional and international organizations

Countries hosting MAIZE offices

Regional and international organizations

Non-government and farmer cooperative organizations