



USAID
FROM THE AMERICAN PEOPLE

Agricultural Biotechnology *for* Development





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Through a unique public-private partnership, USAID is supporting the development of insect resistant eggplant varieties in India, where they will be released as commercial hybrids and royalty-free, open pollinated varieties. The new eggplant varieties will have greater yields and are expected to reduce pesticide usage by up to 85 percent. The same technology is being transferred from India to the Philippines and Bangladesh. Through the combined participation of the commercial and public sector, this partnership is ensuring that the benefits of biotechnology reach resource-poor farmers and consumers.

Increased Agricultural Productivity through Biotechnology

In many developing countries, especially for the rural poor, economic growth and increased income-earning opportunities depend on the performance of the agriculture sector. Over the last 20 years, improved crop varieties have accounted for an estimated half of the improvements in agricultural productivity. Science and technology are key components of the U.S. Agency for International Development (USAID) agriculture strategy.

Developing New Crop Varieties

Agricultural biotechnology offers an additional tool for increasing crop productivity, especially when conventional methods cannot deliver on breeding targets. USAID's goal is to promote access to the tools of biotechnology by scientists and by smallholder farmers around the world. Improved access will increase productivity, and reduce economic and social risks due to pest, disease, and natural resource fluctuations and constraints. Some of the crop varieties derived through biotechnology will help improve the environmental quality of agriculture by reducing dependence on chemical pesticides.

USAID supports crop improvement at all stages of the pipeline from laboratory research to field trials to commercialization and delivery of technology, thereby ensuring that research investments lead to new crops in farmers' fields. Parallel investments in our partner countries assist with building effective regulatory systems that ensure appropriate safety measures are taken while moving bioengineered crops through this process.

USAID Supported Crops and Technologies	Region of Impact
<p>Crop breeding using bioengineering</p> <ul style="list-style-type: none"> • Eggplant resistant to fruit and shoot borers • Disease resistant banana • Virus resistant cassava • Cowpea resistant to podboring insects • Potatoes resistant to potato tuber moth and fungal disease • Drought and salt tolerant rice • Virus resistant papaya • Rice and maize with increased minerals and vitamins • Virus resistant peanuts 	<ul style="list-style-type: none"> • India and Philippines • East Africa • Africa • West Africa • South Africa and India • South Asia • Philippines and Bangladesh • Worldwide • East Africa and India
<p>Crop breeding with genetic markers</p> <ul style="list-style-type: none"> • Tomatoes resistant to multiple viruses • Drought tolerant and disease and pest resistant peanuts • Virus resistant rice • High yielding and stress tolerant cowpeas • Beans with improved nutrient use and disease resistance • Biofortified staple crops for increased minerals and vitamins • Disease resistant cocoa • Disease resistant sorghum 	<ul style="list-style-type: none"> • West Africa • West Africa and India • Africa • West Africa • South and Central America • Worldwide • West Africa • West Africa
<p>Diagnostics</p> <ul style="list-style-type: none"> • Molecular diagnostic tools for crop diseases • Molecular diagnostics and vaccines for livestock diseases 	<ul style="list-style-type: none"> • Worldwide • Africa



ANDREW KIGGUNDU, NATIONAL AGRICULTURAL RESEARCH ORGANIZATION, UGANDA (NARO)

Pests and disease are a constraint to the cultivation of banana, a major food crop for smallholder farmers in Africa, where yield losses sometimes reach 100 percent. Breeding bananas is particularly challenging because most edible bananas are sterile; modern biotechnology methods therefore hold considerable promise. Through an international public sector partnership, USAID supports the development of bananas engineered to resist disease. These bananas initially will be evaluated for efficacy and safety in field trials in Uganda, where crop losses due to diseases are very severe.

The African Agricultural Technology Foundation (AATF) facilitates public-private partnerships to access proprietary technology and to ensure the delivery of technology through the local private sector. AATF's management of these linkages upstream and downstream of public research has assisted the delivery of new maize varieties in Kenya that are resistant to the devastating parasitic weed striga, and has established an international partnership to develop insect-resistant cowpea.



JEREMY OUEDRAOGO, INSTITUT DE L'ENVIRONNEMENT ET DE RECHERCHES AGRICOLES, BURKINA FASO (INERA)

Enabling Policy Environments

Regulatory Frameworks.

Biotechnology regulatory frameworks are essential for countries to access and safely deploy the products of modern biotechnology. USAID supports regulatory development and policy analysis in relation to broader economic, food security, environment and trade issues. USAID partnerships aim to strengthen environmental safety and food safety policies, and to build the local capacity for the development and implementation of science-based regulations.



MICHIGAN STATE UNIVERSITY

Dr. Geoffrey Arinaitwe of the National Agricultural Biotechnology Center in Uganda explains his research.

Regional Approaches. Regional policy cooperation promotes the exchange of experience among neighboring countries, harmonization of regulation, facilitation of trade, and technology spill-over. USAID supports African regional organizations such as ASARECA, COMESA and ECOWAS as they lead regional biotechnology policy efforts. Similarly, USAID supports cooperative policy dialogs and capacity building with regional Asian forums such as APEC and ASEAN.

Intellectual Property Management and Technology Transfer.

The public sector in developing countries often lacks the institutional capacity to acquire the intellectual property (IP) rights needed to conduct research, as well as to promote transfer of technology to the local private sector for commercialization. Through organizations such as the AATF and U.S. universities, USAID partners assist developing country researchers to access proprietary technology. In India, for example, a U.S. university-led partnership is providing mentorship and training to agricultural universities to establish IP management systems that promote technology transfer to the private sector.

Communication and Public Outreach.

Biotechnology communication is essential to ensure stakeholder participation in the development of policies and the adoption of new technologies. Farmer associations, seed companies, policy makers, and the public all have a stake in decisions regarding biotechnology. With USAID's support, local organizations conduct outreach activities to ensure that stakeholders have the necessary resources to make informed decisions about biotechnology.

USAID is committed to better understanding and addressing the potential environmental risks and benefits surrounding biotech crops. The Biotechnology and Biodiversity Interface initiative awards competitive grants for research on the potential impact of biotech crops on wild biodiversity. Recent awards support research on gene flow and the environmental impacts of biotech varieties of sorghum, maize, rice, cotton, cowpea and aquaculture fish.

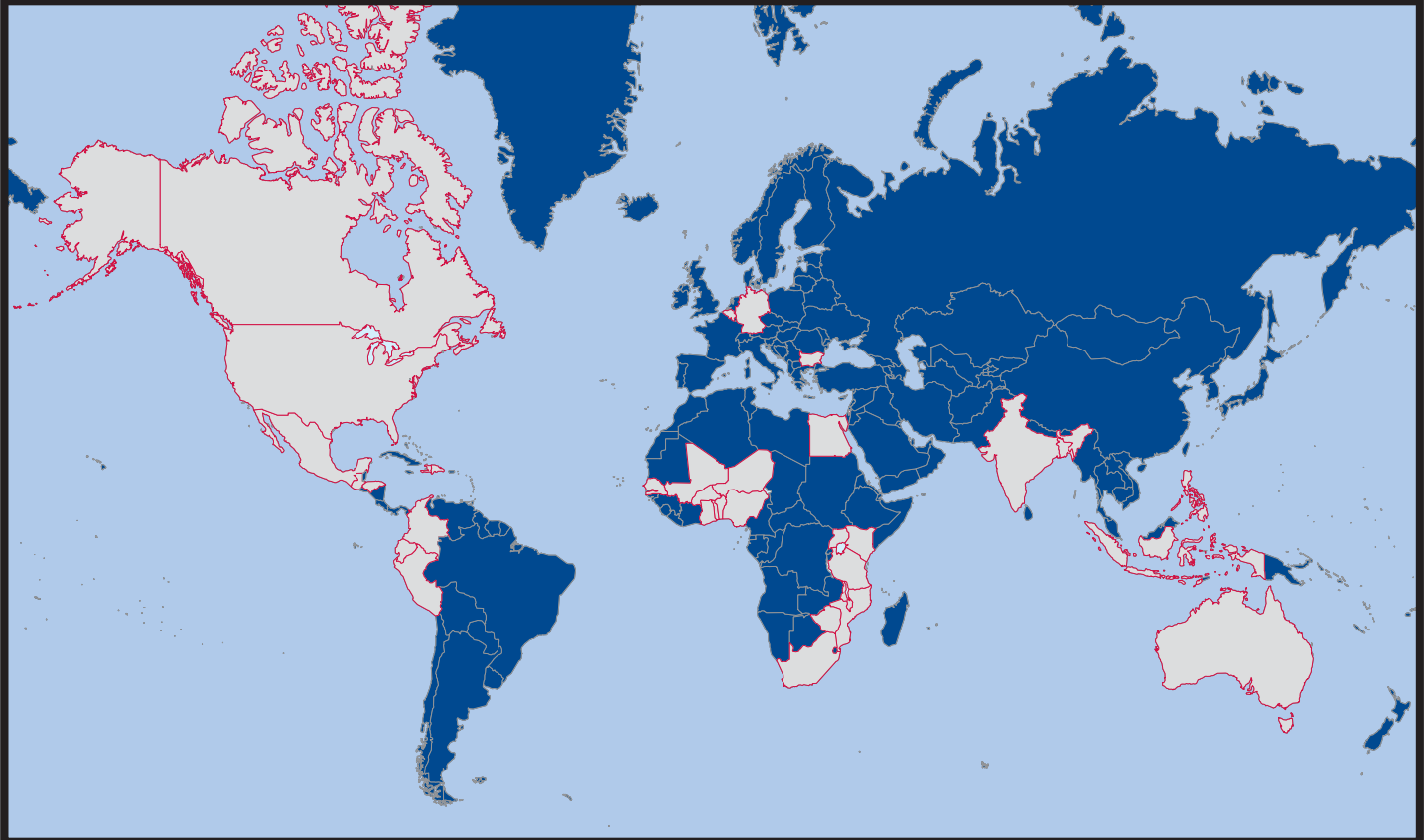
Through the South Asia Biosafety Program (SABP), USAID supports biotechnology and biosafety policy formation in India and Bangladesh. SABP works closely with government regulatory agencies to strengthen the capacity for regulatory decision-making, to enhance food safety assessments for biotech crops, and to improve the efficiency and transparency of field trial approvals. Through training workshops with the research community, agricultural extension workers, and the media, SABP aims to increase stakeholder understanding and participation in applying biotechnology to solve agricultural problems.



SOUTH ASIA BIOSAFETY PROGRAM (SABP)

Map of Countries with USAID Partner Institutions

 Countries with Partner Institutions



Captions and credits for Front Cover Photos:

• Scientists and regulators receive training in Insect Resistance Management (IRM) through the Philippines Bureau of Plant Industry in partnership with Michigan State University, Credit: Michigan State University • Farmers work in terraced rice fields in India, Credit: (c) 2006 Saurabh Mittal/Courtesy of Photoshare • Farmers harvest sorghum in Burkina Faso, Credit: (c) Bill Horn/Lutheran World Relief, Courtesy of Photoshare • A woman sells produce at a market in India, Credit: (c) 2000 Todd Shapera/Courtesy of Photoshare

Captions and credits for Back Cover Photos:

• Water buffalo and rice fields in the Philippines, Credit: Ariel Javellana/International Rice Research Institute • Maize plant in field, Credit: LLC/Vstock • Virus-resistant papayas are evaluated in a greenhouse in the Philippines, credit: Larry Beach/USAID



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