



WEMA

Water Efficient Maize for Africa

Progress Report

March 2008–March 2011

The project

The Water Efficient Maize for Africa (WEMA) project is a public-private partnership led by the African Agricultural Technology Foundation (AATF) to address the devastating effects of drought on smallholder farmers. The project partners have been developing new drought-tolerant African maize varieties since 2008, incorporating the best technologies available: conventional advanced plant breeding and biotechnology.

The WEMA varieties will be made available royalty-free by local seed suppliers to smallholder farmers in Sub-Saharan Africa (SSA). The first conventional hybrids developed through conventional advanced breeding will be available after about four or five years of research, from 2008. Farmers will then be able to access maize hybrids developed through biotechnology in about eight years (of research), depending on research and development results and regulatory approval.

This report presents the progress of the project since its launch in March 2008 up to March 2011.

The partnership

- AATF contributes its leadership skills, experience in public-private partnerships, and technology stewardship in ensuring that this project is a success. To achieve this, the Foundation works with the following partners:
- Various African countries' National Agricultural Research Systems (NARS) contribute their expertise in breeding, field testing, seed multiplication and distribution. These comprise:
 - Agricultural Research Council (ARC), South Africa
 - Agricultural Research Institute of Mozambique (IIAM)



The WEMA team members visiting a maize trial in Kiboko, Kenya in July 2008.

Partners



Funders



- Kenya Agricultural Research Institute (KARI)
- National Agricultural Research Organisation (NARO), Uganda
- Commission for Science and Technology (COSTECH), Tanzania

- The International Maize and Wheat Improvement Center (CIMMYT) provides high-yielding maize varieties that are adapted to African conditions, and expertise in conventional breeding and testing for drought tolerance.

- Monsanto, a private agricultural company, is donating proprietary germplasm, advanced breeding tools and expertise, and drought-tolerance transgenes developed in collaboration with BASF. These contributions will be

provided without royalty to seed companies for the benefit of smallholder farmers in SSA.

- The funding partners are the Bill and Melinda Gates Foundation and Howard G Buffett Foundation.

Key activities: March 2008 – March 2011

Collaboration agreements signed

To concretise and consolidate the WEMA partnership, all the partner organisations signed collaborative agreements in 2008 with AATF, which leads the partnership to implement the WEMA project activities in their organisations.

In January 2008, AATF, CIMMYT and Monsanto adopted a global access strategy with the signing of a tripartite WEMA Research

Collaboration Agreement committing partners to donate background intellectual property created before the WEMA project to AATF. This was followed by the signing of sub-grant agreements between AATF and CIMMYT, and between AATF and each of the respective NARS partners from Kenya, Mozambique, South Africa, Tanzania and Uganda.

WEMA project launched

Following the signing of the collaborative agreement, the partners gathered in Kampala, Uganda in March 2008 to develop the WEMA development phase project work plan and to officially launch the project. The Director General of the National Agricultural Research Organisation of Uganda, Dr Dennis Kyetere, who presided over the official launch of the initiative, said that the project would help address drought and contribute to improving food security in Africa. 'Drought is a source of food insecurity and suffering for many people in Uganda and it is recognised as a challenge by the government. Drought causes up to 100% crop failure in Uganda in some instances,' said Dr Kyetere.

The WEMA partnership fits well with the AATF mandate of facilitating innovative public-private partnerships that bring to smallholder farmers in Sub-Saharan Africa



The WEMA partners at the project launch meeting held in Kampala in March 2008

the tools needed to increase productivity for better food and income security.

Formation of work teams and harmonisation of the work plan

After the successful launch of the WEMA project, partners met in Bagamoyo, Tanzania in May 2008 and in Nairobi, Kenya in July 2008 to discuss and harmonise the project work plan and activities. They formed core teams including Product Development Team (PDT), Regulatory Compliance Team (RT), Communication and Outreach Team (CT), and Intellectual Property Management Team (IPMT) to facilitate knowledge transfer and establishment of best practices. The teams have responsibility for specific

project milestones, and work together to develop work plans and budgets. Each team is composed of members from each partner organisation participating in the project. In each country there are similar and corresponding in-country teams to assist with the implementation of the country activities.

The technical objective is to improve drought tolerance of African maize by combining the benefits of breeding programmes using conventional, molecular and transgenic platforms, and test the efficacy of the drought tolerance technology in African maize germplasm under varied agro-ecologies. This objective is implemented by the Product Development Team (PDT). One of the tenets of the WEMA project

is to ensure that the project activities are in compliance with the national regulatory systems in each country, and this is executed by the RT. The role of the CT is to create awareness and promote public acceptance of the project and its products. The IPMT coordinates all intellectual property related negotiations among the project partners and assists in the implementation of the commercialisation strategy (global access strategy) of the project. The project management is supported by an Operations Committee (OPSCOM). A high level policy oversight is provided by an Executive Advisory Board (EAB) with membership drawn from each of the partner organisations including NARS Director Generals or their designees.



Prof Peter Msola (seated), the then Minister for Communication & Technology for Tanzania signs the visitor's book after viewing the WEMA display at the 2009 Nane Nane farmers show in Dodoma as Nicholas Nyange (left) and Godlease Malisa (right) of COSTECH look on

Each team works through regular scheduled face-to-face meetings, monthly teleconferences, and email and telephone communication. All teams come together once a year for an Annual Review and Planning Meeting.

Identification and development of trial sites

To enable the testing of both the conventional and transgenic drought-tolerant maize, field sites were identified in 2008 and developed for managed drought stress trials under conventional breeding at Monsanto and CIMMYT fields in Kenya and South Africa and for transgenic trials in all the five WEMA countries. The country sites located in Dodoma in Tanzania, Kiboko in Kenya, Chókwé, in Mozambique, Kasese in Uganda, and Lutzville in South

Africa were chosen because of their dry climate that is ideal for testing WEMA maize varieties under managed drought stress conditions. The sites have well defined periods during the year when they do not receive any rainfall.

Confined field trial (CFT) sites with drip irrigation systems were developed in all partner countries in readiness for the evaluation of the performance of the WEMA drought-tolerant genetically modified (GM) maize beginning 2010. The first transgenics trials are in progress to test drought-tolerant GM plants under field conditions; assess the value of the drought-tolerant trait under managed stress in a local environment; and enable selection of the best germplasm for Kenya and Uganda. The experiments will also provide data on the safety of the plants and the trait, an essential step for

subsequent risk assessment and regulatory approval.

Drought-tolerant gene for WEMA

In June 2009, Monsanto officially announced the source of the gene to be used in the WEMA project. The cold shock protein *B* (*CspB*) gene is from a common soil micro-organism, *Bacillus subtilis*, which is used in the preparation of Japanese soy food, *natto*. The gene was initially identified in bacteria under cold stress. This gene helps plants to cope with the stress of drought. The beneficial gene was discovered by Monsanto in collaboration with BASF, and in a partnership of private and public players, the company has provided a research license through AATF to the national institutions in the five African countries participating



The WEMA-Tanzania confined field trial site developed in 2009 in Dodoma



Dr Stephen Mugo of CIMMYT during the harvesting of the WEMA-Kenya mock trial in February 2010

in the project to enable testing of the hybrids. The gene is expected to provide gains in drought tolerance in the WEMA project that will complement those obtained through other conventional breeding programmes. For more information on the gene please visit <http://www.monsanto.mediaroom.com/index.php?s=43&item=710&printable>

WEMA breeding and testing programme

The WEMA breeding programme started in 2008 with Monsanto evaluating promising elite maize inbred lines it previously developed and those from existing high-yielding local germplasm that is adapted to tropical mid-altitude agro-ecologies found in Sub-Saharan Africa developed by CIMMYT under its Drought Tolerant Maize

for Africa (DTMA) Project, which uses conventional breeding. Varieties from the DTMA project are already showing the power of drought tolerance providing 20 – 30% higher yields for farmers who adopt the varieties. WEMA is incorporating a drought tolerance trait developed and donated by Monsanto and BASF into DTMA-developed varieties using transgenic breeding, sometimes referred to as genetic modification. This will contribute additional levels of drought tolerance beyond those gained through conventional advanced breeding techniques. In 2009, the WEMA team tested several conventional drought-tolerant crosses under well watered and water-stressed conditions. Field trials by Monsanto and the ARC of South Africa for transgenic drought-tolerant maize started in South Africa in 2008 and 2009, respectively. Similar repeat trials were also conducted during the 2010/2011 period.

Permit approvals to conduct similar trials in Kenya and Uganda were granted in 2010 by the respective country national biosafety authorities. The trials were planted in Uganda in November 2010 and harvested in March 2011 and in Kenya they were planted in December 2010 and harvested in April 2011. Data analysis from the trials is in progress. Applications to conduct confined field trials (CFTs) in Tanzania and Mozambique have been made and approvals are awaited. The conduct of CFTs is a key step towards the approval of improved varieties for deployment to smallholder farmers.

To build the capacity of teams to conduct the transgenic trials from 2010 onwards, mock trials using conventional maize simulating steps to be followed during CFTs for GM maize were done in Kenya and Tanzania in 2009 and in Mozambique in 2010. The mock trials have provided an opportunity for researchers working on the WEMA project to fine tune the procedures for carrying out the transgenic CFTs. Although conducting a mock trial is not a regulatory requirement, a notification to do so was submitted to the National Biosafety Committees (NBCs) in the three countries as part of the training. Approval was given after the application and the sites were assessed and found to comply with the requirements to conduct a transgenic CFT.

Awareness campaign

Creating awareness on the benefits that the WEMA drought-tolerant maize varieties will bring to smallholder farmers in Sub-Saharan Africa and to build support from all the relevant stakeholders is a crucial component of the project. The WEMA communications and outreach strategy recognises the need for reaching out to each stakeholder, both external and internal, in a way that is effective to them. Since its launch, the project has continued to reach out to the various audiences through multiple channels and approaches. This has been through the development of global and country specific communication materials and tools like project briefs, frequently asked questions and the project website (<http://www.aatf-africa.org/wema/>).

The project has formed strategic partnerships and

networks to enhance its biotech outreach activities by working with biotech communications organisations such as AfricaBio for the southern Africa region and the International Service for the Acquisition of Agribiotech Applications (ISAAA) for the eastern Africa region; and established linkages with biotech initiatives such as the Open Forum for Agricultural Biotechnology (OFAB) in Uganda, Tanzania and Kenya.

In realisation of the key role played by the media to reach a variety of audiences, the project has partnered with both print and electronic media to communicate the benefits of the WEMA initiative and new agricultural technologies. Between 2009 and 2011, the project organised three capacity building workshops for science journalists from the five project countries. Since the project launch to date WEMA has received over 200 mentions in both the print and electronic media.

Another communication strategy has been to exploit the opportunities provided by local and international events to present and showcase WEMA to a varied category of audiences. Since its launch, the WEMA project has been presented and exhibited in over 70 such events. The country teams have also outreached to key audiences through annual national stakeholder meetings and a regional stakeholder meeting held in April 2010.

‘Seeing is believing’ study tours

‘Seeing is believing’ hence the WEMA project has organised study tours to countries growing GM crops for project teams and stakeholders including policy makers in government, legislators, regulators, seed companies, farmer associations and the media. These include study tours to the Philippines in September 2009, and Canada in September 2010 for the project’s PDT and RT members, and to Thailand in March 2011 for the PDT members. Similar tours targeting policy makers from the WEMA countries were organised to South Africa and Argentina in April and November 2010, respectively. Study tour participants have been taken through each of the country’s biosafety



Mr Zephania Ubwani a journalist with The Citizen in Tanzania at a WEMA media workshop held in Nairobi in 2010

Strengthening capacity to deliver drought-tolerant maize

Various training workshops have been held since 2008 to enhance the capacity of the WEMA teams to meet their objectives and eventually deliver the drought-tolerant maize into the hands of smallholder farmers in SSA. These include courses for PDT members in 'Breeding for drought tolerant maize' held in Nairobi, Kenya in September 2008 and in Harare, Zimbabwe in August 2010; and a 'Soil and irrigation management training' held in Nairobi and Kiboko, Kenya in October 2010.



WEMA stakeholders from all the five project countries on a field visit in South Africa

regulatory processes and experiences in handling GM crops; an exposure to the levels of biotech adoption in each of the countries; and an

opportunity to visit farms and interact with farmers growing biotech crops for experimental learning.



The WEMA Product Development Team members watch a demonstration on how to install soil moisture probes during an irrigation training in 2010 in Kiboko, Kenya



WEMA Product Development Team members try out the jabber - a seed planting tool during the study tour to Thailand in March 2011

A confidentiality training course held in Nairobi in August 2009 focused on key issues relating to private sector confidentiality requirements regarding information management versus the public good responsibility of the public sector. Training on intellectual property management was held in Nairobi in October 2010 focusing on building a common understanding among project partners on the intellectual property aspects of the WEMA project. Issues related to copyright, patents, and plant variety protection were discussed. A regulatory compliance training workshop targeting the RT and the PDT members including the CFT managers was held in August 2009 in Kampala, Uganda. In addition, in-country compliance

training workshops were held in all the countries. To build the capacity of the internal stakeholders to communicate on the WEMA project as spokespeople, two risk communication and message management training workshops were held in Nairobi in August 2009 and October 2010. The WEMA Communication Team members and spokespeople from AATF attended high-level communication training organised by the Bill & Melinda Gates Foundation in 2008 and 2009 in South Africa and the United States of America, respectively.

Stakeholders rate WEMA

The various WEMA stakeholders evaluated

the project as good in the 2009 and 2010 annual social audit of the project. The audit is conducted by an independent programme at the McLaughlin-Rotman Centre for Global Health, University of Toronto to assess and monitor social, cultural, ethical and commercialization (ESC²) issues related to the WEMA project. The audit which is an effort to ensure all stakeholder concerns are taken into account during the development and deployment, and also serve as an additional communication channel for stakeholders of the WEMA project, is funded by the Bill & Melinda Gates Foundation. The audit collects information that measures the project's performance and reports on the ESC² aspects of the WEMA project from the viewpoint of a range of stakeholders. The goal of the social audit is to improve accountability, transparency and management; and facilitate trust-building among WEMA partners, and between WEMA and the general public. The 2009 and 2010 social audit reports of the WEMA project and the WEMA management response to the findings can be accessed at: http://www.aatf-africa.org/wema/audit_reports/social_audit_report/en/.

AATF is a not-for-profit Foundation designed to facilitate and promote public/private partnerships for the access and delivery of proprietary agricultural technologies for use by resource-poor smallholder farmers in Sub-Saharan Africa. AATF is a registered charity under the laws of England and Wales and has been given a tax-exempt status in the USA. It is incorporated in Kenya and in the UK and has been granted host country status by the Government of Kenya where it is headquartered.

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