



## Enhancing maize productivity in Uganda through the WEMA project

### About WEMA

The Water Efficient Maize for Africa (WEMA) project is a public-private partnership coordinated by AATF to develop drought-tolerant African maize using conventional breeding, marker-assisted breeding, and biotechnology and make it available royalty-free to small holder farmers in Sub-Saharan Africa.

### About NARO

The National Agricultural Research Organisation (NARO) is the apex body for guidance and coordination of all agricultural research activities in the national agricultural research system in Uganda ([www.naro.go.ug](http://www.naro.go.ug))

### About AATF

The African Agricultural Technology Foundation (AATF) is a not-for-profit organisation that facilitates and promotes public-private partnerships for the access and delivery of appropriate proprietary agricultural technologies for use by resource-poor smallholder farmers in Sub-Saharan Africa ([www.aatf-africa.org](http://www.aatf-africa.org)).

### Introduction

Uganda's economy is predominantly agrarian. Agriculture contributes about 40 percent of the Gross Domestic Product (GDP) and is the main source of livelihood and employment for over 80 percent of the population in rural areas (MFPED, 2003). Government policies and strategies over the years have placed emphasis on promoting agricultural development as a mechanism for raising rural incomes and reducing poverty (Sserunkuuma, 2003).

The development blue print for Uganda is articulated in a five-year National Development Plan (NDP) launched in 2010. The plan contains a series of proposals intended to firmly set Uganda on the path to becoming a middle-income country. It outlines strategic programmes for the socio-economic transformation of Uganda to a modern and prosperous country from a peasant economy within 30 years. The key tenets of the plan are to improve road, rail networks and energy sector, create employment opportunities, improve labour force and use the private sector as the engine of growth and development.

To align its strategic objectives with the national vision, the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), which is the parent ministry to the National Agricultural Research Organization (NARO), has developed a Development Strategy and Investment Plan (DSIP) with a focus on key priority areas of investment to spur agricultural growth:

- (a) enhancing production and productivity,
- (b) market access and value addition,
- (c) improving the enabling environment for the agricultural sector, and
- (d) institutional development.

Within the DSIP, NARO is seen as a key player in providing high yielding seeds to farmers to increase agricultural productivity and income. The government has also resolved to support the generation, dissemination and adoption of



productivity-enhancing technologies including modern biotechnology. For instance, the goal of the national biotechnology policy is to contribute to the national goals of poverty eradication, improved healthcare, food security, industrialisation and the protection of the environment through the safe application of biotechnology.

Building on Uganda's vision and commitment for economic development and social transformation as contained in the NDP and DSIP, the government signed the Comprehensive Africa Agriculture Development Program (CAADP) compact in March 2010. CAADP commits the government to increase investment in agriculture by a minimum of 10 percent of the national budget and to raise agricultural productivity by at least 6 percent per year.

Uganda is one of the five countries participating in the Water Efficient Maize for Africa (WEMA) project. Other participating countries are Kenya, Tanzania, Mozambique and South Africa. WEMA was launched to mitigate production constraints associated with drought. It is a public-private partnership project formed in 2008 and coordinated by the African Agricultural Technology Foundation (AATF). The partnership is funded by the Bill and Melinda Gates and Howard G. Buffett Foundations. The project aims at developing and deploying royalty-free drought-tolerant maize varieties using a combination of conventional breeding, marker-assisted breeding and biotechnology techniques and applications.

This policy brief examines the potential of WEMA in enhancing maize productivity in Uganda.

## **The maize sub-sector in Uganda**

Maize is widely grown in Uganda covering about 50 districts. The main production agro-ecological zones are in the west, east, north and southeast Uganda. The crop is cultivated by over 3.6 million households on about 1.5 million hectares of land (UBOS, 2006). In terms of area planted, maize is

the third most cultivated crop after banana and beans. In some regions of the country, the crop has now become a staple food, replacing crops like sorghum, millet, cassava and banana. It is a growing source of household income and foreign exchange through exports. For example, maize is presently considered a major source of income in the districts of Kapchorwa, Mbale, Iganga, Masindi and Kasese, with about 75–95 percent of the household harvest being sold to earn money. In 2008 alone, maize is estimated to have generated over US\$ 18.5 million in export earnings from an estimated 66,700 tonnes. The regional destinations for maize exports include Kenya, Sudan, Rwanda, Burundi, Zambia and DR Congo. Kenya is Uganda's largest importer of maize. The Kenyan formal and informal market accounts for about 50 percent of the total maize exports from Uganda.

In the year 2007, Uganda produced about 1.2 million metric tonnes of maize (FAO, 2009). The country has a potential of producing up to 7.5 million metric tonnes utilising the current area under maize. However, this is never achieved largely due to various production constraints including low soil fertility, lack of improved maize varieties, erratic rainfall patterns and drought stress during some seasons. Maize production is generally characterised by low yields, which result in high unit costs and thus low returns. Regardless of the farm sizes, Uganda's maize yield levels are low and are generally between 1.0 and 1.8 metric tonnes/hectare (RATES, 2003). Crop failure due to drought can cause losses of up to 80 percent. The magnitude of the problem is high in districts such as Kasese where losses can reach catastrophic levels. Other drought-prone regions include eastern, north-eastern and northern Uganda.

## **The WEMA project**

The WEMA partnership was formed in response to a growing call by African farmers, leaders, and scientists to address the effects of drought in a way that is cost effective for African smallholder farmers.



AATF works with the internationally funded non-profit International Maize and Wheat Improvement Center (CIMMYT), the private agricultural company Monsanto, and the National Agricultural Research Systems (NARS) in eastern and southern Africa in this effort. Each partner brings unique expertise to the project. AATF contributes expertise in leadership, public-private partnership management, technology stewardship and project management. CIMMYT provides high-yielding maize varieties that are adapted to African conditions and expertise in conventional breeding and testing for drought tolerance. Monsanto provides proprietary germplasm, advanced breeding tools and expertise, and drought-tolerance transgenes developed in collaboration with BASF. The national agricultural research systems, farmers' groups, and seed companies participating in the project contribute their expertise in field testing, seed multiplication and distribution.

The varieties developed through the project will be distributed to African seed companies through AATF royalty-free and made available to smallholder farmers as part of their seed business. The project involves local institutions,

both public and private, and in the process expands their capacity and experience in crop breeding, biotechnology, and biosafety. The benefits and safety of the maize varieties that will be developed will be assessed by national biosafety authorities according to regulatory requirements in the partner countries.

The first conventional hybrids developed through marker-assisted breeding could be available after seven years of research and development. For the drought-tolerant varieties developed through transgenic means, it is projected that farmers could have access to the seeds between 2015 and 2017. This will take slightly longer because of the technology development pathway and the biosafety regulatory requirements that have to be addressed prior to commercial release.

## Conclusion

WEMA is an important and relevant project expected to contribute towards realising agricultural development and poverty reduction goals in Uganda such as DSIP, the National Biotechnology and Biosafety Policy (2008), the new five-year National Development Plan (NDP) and the CAADP agenda. The partners will develop new African drought-tolerant maize varieties, incorporating the best technology available internationally. The long-term goal is to make drought tolerant maize available royalty-free to small-scale farmers in Sub-Saharan Africa – most of whom are women – so they can feed their families and increase their incomes.

The project will mitigate the adverse impacts of drought in chronically drought vulnerable districts such as Kasese, Karamoja sub-region, Nakasongola, Kiruhura, and Buliisa among others and strengthen the resilience of maize farmers to cope with the erratic climatic conditions. It is expected that commercialisation of maize varieties that will be developed under WEMA will translate to 25 percent increase in yields in drought-prone areas. The increased yields will enhance food security, increase household incomes of small holder farmers and government revenue generated through exports

to markets in the region. While appreciating the significant contribution that WEMA can make, the success of the project will to a large extent be driven by a conducive policy environment, and strong and sustained political support. Policy makers within the relevant government institutions and agencies should create an enabling environment and make science-based decisions that will facilitate the conduct of confined field trials and other important stages that will eventually pave the way for commercialisation. While Uganda has formulated a supportive biotechnology policy, the passage of the biosafety bill and drafting of enabling implementing regulations should be accelerated to facilitate smooth and timely implementation of the WEMA project.

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