vulnerable smallholder maize farmers to cope and recover. At the national level, the country has failed to achieve self-sufficiency in maize production. This has placed Kenya in the category of countries that depend on imported maize and humanitarian emergency relief operations. In this respect, WEMA was launched as a demand-driven technological innovation designed to strengthen the resilience and adaptive capacity of maize farmers to cope with drought.

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 smallholder farmers in Sub-Saharan Africa most of whom are women—so they can enhance their food security and increase household incomes.

Risk of crop failure from drought is one of the primary reasons why smallholder farmers in Africa do not adopt improved farming practices. A more reliable harvest would give farmers the confidence to adopt new technologies. With the expansion of maize production in the areas susceptible to drought, it is expected that farmers will get higher, stable, and reliable yields. Commercialisation of maize varieties being developed under WEMA is projected to increase yields in the drought-prone areas within the range of 25 percent compared to the current varieties.

Strong and consistent policy support is critical to the success of WEMA project in Kenya. 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 biosafety regulatory steps that will eventually lead to commercialisation of WEMA seed varieties. The WEMA project is only part of what is needed to help smallholder farmers boost their yields and incomes. Farmers also require good soil health, training and extension services, effective pest and disease management practices, sound infrastructure, and access to markets to sell their surplus.

**References**


**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).

**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 smallholder farmers in Sub-Saharan Africa.

This policy brief is produced by the African Agricultural Technology Foundation (AATF) with contribution from Daniel Otunge, Nancy Muchiri and Grace Wachoro.

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Policy Brief

Reducing maize insecurity in Kenya: the WEMA project

**Introduction**

Kenya is one of the five countries participating in the Water Efficient Maize for Africa (WEMA) project. Other countries are Tanzania, Uganda, Mozambique and South Africa. WEMA 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. It 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 highlights the food insecurity challenges that Kenya has been experiencing in recent years and presents the potential benefits of WEMA in mitigating maize production constraints occasioned by drought.

**Background**

Agriculture is the mainstay of Kenya’s economy. It accounts for approximately 27 percent of Kenya’s Gross Domestic Product (GDP) and is the main source of livelihoods for about 80 percent of the population in rural areas (MoA, 2009). Over the years, the Kenya Government has strived to achieve national, household, and individual food security. This is evidenced by several development strategies and policies that have been prepared and launched to steer the development of the agricultural sector in the country. They include the “Strategy for Revitalizing Agriculture (SRA) (2004-2014)”. Kenya’s current development goals and ambitions are articulated in the Vision 2030. The blueprint has identified agriculture as one of the six economic sectors expected to drive the economy to a projected 10 percent economic growth annually over the next two decades through promotion of an innovative, commercially oriented and modern agriculture (GoK, 2007). Ensuring food security and nutrition has been a key element in Kenya’s agricultural policies and strategies.

Since independence, the government has concentrated on policies aimed at enhancing maize production to boost the country’s food security. For many years food security was equated to self-sufficiency in maize production.

**Maize and food security in Kenya**

Maize is the most important and widely consumed cereal in Kenya. It is the staple food crop for 96 percent of Kenya’s population with 125 kg per capita consumption and provides 40 percent of the calorie requirements (Byerlee and Eicher, 1997).
Drought and unpredictable weather conditions have led to a succession of failed seasons in key production areas. Successive crop failure has been compounded by rising food prices and a state of chronic food insecurity in the country. The precarious situation has adversely affected both rural and urban households. Increase in the price of maize from time to time has often impacted adversely on the poor who divert meagre household incomes to maize. In 2009, maize prices were 100 to 130 percent higher than normal levels (USAID, 2009).

The country’s dependence on rainfall is one of the root causes of the country’s vulnerability to drought. Agriculture, which is the mainstay of the economy, is almost entirely rain-fed. Unless the drought phenomenon is adequately addressed, it may hinder Kenya’s efforts to achieve the Millennium Development Goals (MDGs). The most important one related to agriculture is the first MDG on eradicating of poverty and hunger.

Modern biotechnology provides a major opportunity to address perpetual maize shortages that are now being compounded by new threats triggered by climate change. Harnessing biotechnology to develop maize seed varieties with traits of drought tolerance is therefore a key mitigation and adaptation strategy.

The WEMA promise
The Water Efficient Maize for Africa (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 to 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 its unique expertise to the project. AATF contributes its leadership, experience in public-private partnership management, technology stewardship and project management expertise. 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 partnership involves local, public and private institutions, which in the process of implementing the project are expanding 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 six or 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 first varieties by 2015 and 2017. This will take slightly longer because of the technology development process and the biosafety regulatory requirements that have to be addressed prior to commercial release.

The constraints impacting on maize production are numerous and diverse. The WEMA project will partly contribute towards addressing the constraints by providing water efficient maize seeds, addressing the serious drought challenge. Stable and reliable yields will revitalise and build the confidence of farmers in maize production. Stability in yields will give farmers the confidence to invest in other productivity enhancing technologies such as sustainable soil management practices.

About 70 per cent of Kenya’s maize is believed to be produced mainly by farmers in the North Rift Valley region, traditionally Kenya’s ‘grain basket’. WEMA is a technological opportunity to expand maize production in the areas susceptible to drought such as the arid and semi-arid lands (ASALs). About 10 million Kenyans live in the ASALs which cover 80 percent of Kenya’s land area. Farmers in these highly vulnerable to drought areas possess low levels of resilience and adaptation.

There have been several interventions in the areas of weather forecasting, drought monitoring and early warning systems. The WEMA project will play an important role in building the resilience of farmers to cope with drought. Increased production of maize in drought-prone areas will translate to increased yields and improved food security both at the household and national levels. It is projected that maize varieties to be developed could increase yields by 25 percent compared to current varieties. This increase would translate into about two million additional tonnes of food during drought years.

Conclusion
The volatile climatic conditions, and in particular drought, pose a major threat to the agricultural sector, maize security and livelihoods of smallholder farmers in Kenya. Drought has become a frequent phenomenon making it difficult for the affected...