

## *Frequently Asked Questions*

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### **What is WEMA?**

The Water Efficient Maize for Africa (WEMA) project is a public-private partnership coordinated by the African Agricultural (AATF) to develop drought-tolerant and insect-protected maize varieties. The purpose of these improved varieties is to produce more reliable harvests under moderate drought conditions and protect maize from insects. These varieties will offer benefits to smallholder farmers – most of whom are women – so they can feed their families and increase their incomes.

The project uses both conventional advanced plant breeding and biotechnology in the development of the maize varieties. The WEMA varieties will be marketed by local seed suppliers royalty-free to smallholder farmers in Sub-Saharan Africa (SSA).

### **Why is drought tolerance important for smallholder farmers?**

Africa is a drought-prone continent, making farming risky for millions of smallholder farmers who rely on rainfall to water their crops. Maize is the most widely grown staple crop in Africa – more than 300 million people depend on it as their main food source – and it is severely affected by frequent drought. Drought leads to crop failure, hunger, and poverty. Climate change will only worsen the problem. Identifying ways to mitigate drought risk, stabilise yields, and encourage small-scale farmers to adopt best management practices is fundamental to realising food security and improved livelihoods for the continent.

### **Why is insect protection needed in WEMA?**

Drought is just one of the many challenges facing Sub-Saharan African farmers. Insects present additional challenges as farmers in the developing world have little or no resources to effectively manage them. After four years of research on drought tolerance it became clear that insects were having significant impact on yield that could negatively impact the benefits possible through drought tolerance.

Stem borer insect pests feed on every major part of the maize plant thus reducing the flow of water and nutrients, causing stem breakage due to physical damage and possible development of toxins caused by damage to the plant. Some of the most dramatic losses occur when drought conditions and insect pressure combine in the field. Drought negatively impacts overall plant health resulting in a reduction in crop yield. Insects add to the impact by reducing the plant's ability to use already

limited water and nutrients. In severe cases, the combination quickly leads to complete crop failure. The addition of insect pest protection to the WEMA project will help to ensure better plant health so plants will be able to use the water and nutrients they have more efficiently. It will complement and protect yield made possible through the project's ongoing work.

### **How are insects controlled today?**

For most smallholder farmers, the only option for controlling pest insects is to spray the plants numerous times with insecticides that are costly and are not easily available. Insect protected maize provides in-plant insect protection against damaging stem borer insect pests, which allows more widespread and consistent control of target pests on the maize plant.

### **How does insect protection work?**

Insect protection was developed from the naturally occurring soil bacteria, *Bacillus thuringiensis*, or Bt for short, which produces a protein that is toxic to the digestive systems of a targeted group of insects. Through genetic modification, a modified form of the insect-protected gene is inserted into the maize plant, so it can produce the protein on its own. This approach enables the plant to defend itself against these insects and reduces the amount of insecticides needed. Extensive studies have demonstrated that the protein is safe to humans, livestock, wildlife, non-target organisms and beneficial insects. These proteins have been used in organic farming for over 50 years to control insect pests.

### **How will these new varieties benefit farmers?**

These new drought-tolerant and insect-protected maize varieties will provide valuable economic, agronomic and environmental benefits to millions of farmers by helping them produce more reliable harvests under moderate drought conditions and better grain quality due to reduced insect damage. This will help farmers harvest enough to feed their families, a surplus which they can sell to increase their incomes, and help strengthen local communities and countries. A more reliable harvest could also give farmers additional confidence to invest in their farms and improve their farming practices. The addition of insect protection will also reduce pesticide use which will bring benefits to both the environment and human health. A more reliable harvest could give farmers additional confidence to invest in their farms and improve their farming practices.

### **Are these new maize varieties safe?**

The new WEMA varieties, including products developed with transgenic approaches, will need to pass all regulatory requirements and evaluations in the countries where they will be grown before farmers can grow them. The varieties developed through transgenic approaches also undergo extensive health and safety risk assessments -- these detailed food, feed and environmental safety assessments confirm product safety.

As an example, insect protection has been safely used for over 16 years in various parts of the world and has a history of safe cultivation and consumption. Detailed food, feed and environmental safety assessments confirm the safety of this specific insect protection.

**When will small-scale farmers have access to the maize varieties?**

The long-term goal of the project is to complete development and make the drought-tolerant and insect-protected varieties available royalty-free to smallholder farmers through local seed companies. The first conventional hybrids with improved drought tolerance developed through breeding could be available as early as 2014.

Pending research results and regulatory approvals, farmers in the WEMA countries could have access to drought-tolerant and insect-protected maize varieties developed through transgenic approaches by the later part of the decade.

**How will the maize varieties be developed?**

The maize will be developed using both breeding and biotechnology approaches. The improvements made through advanced breeding and biotechnology should be greater and faster than those that can be accomplished through breeding alone.

**Will farmers be able to save WEMA seeds for replanting?**

WEMA seeds are hybrids. Farmers will be free to save seed for replanting. However, just as with traditional seed, it is good farm management practice to source and plant the best available seed each season for consistently good harvests. This will protect the crop from failures caused by loss in seed quality which occurs each time the harvested grain is saved as seed and used for planting.

**Are insect-protection products already in use?**

Insect protected maize is approved in major maize growing regions of the world. In 2010, insect-protected maize was planted on 10.2 million hectares worldwide, with approximately 1.6 million hectares of this specific insect protected maize planted in South Africa.

Insect-protected maize has been in the market for over 16 years, with over 25 countries growing it today. Since commercialization of insect-protected crops in 1996, this maize has been planted on 106 million hectares in over 25 countries.

**Who are the partners?**

The African Agricultural Technology Foundation (AATF) will work with the International Maize and Wheat Improvement Center (CIMMYT), Monsanto, and the national agricultural research systems in Kenya, Mozambique, South Africa, Tanzania and Uganda. The partners will be contributing their technology and expertise to the project.

The project will involve local institutions, both public and private, and in the process expand their capacity and experience in crop breeding, biotechnology, and biosafety.

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- AATF is contributing its leadership, unique experience in public-private partnership management, technology stewardship, and project management expertise.
- CIMMYT is providing high-yielding maize varieties that are adapted to African conditions and expertise in conventional breeding and testing for drought tolerance.
- Monsanto is contributing maize varieties from its global proprietary collection, drought-tolerant and insect protection genes, and its expertise in agriculture research and product deployment.
- The national agricultural research systems, farmers' groups, and seed companies participating in the project will contribute their expertise in field testing, seed multiplication, and distribution.

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