

Biotech crops in South Africa:

Celebrating a milestone

The year 2015 marked the 20th anniversary (18 in South Africa) of the global production of genetically modified (GM) crops from 1996 to 2015. The first GM crop in the country, cotton, was planted in 1998. GM yellow maize followed in 2000, planted on only 3 000ha. In the 16 years from 2000 to 2015, nearly 20 million accumulated hectares of GM maize were grown in South Africa, yielding well over 50 million tons of grain.

Since then farmers' adoption of this new technology has escalated at an unprecedented rate. GM maize peaked from an initial 3 000ha to a record 2,36 million hectares in 2013. This makes biotechnology the fastest-growing crop technology in recent years, and South Africa ranks ninth as a global GM crop producer.

In 2015, the worst drought in 35 years took its toll on biotech crops in the country. The biotech land cultivated under GM crops decreased by 700 000ha (25%) from the intended 3 million hectares, to 2,3 million hectares (2,7 million in 2014).

Economic gain

GM maize was planted on 1,8 million hectares at an adoption rate of 90% (2,14 million in 2014). White maize accounted for 1,03 million hectares, 86% of the total white maize grown. Yellow maize at 0,96 million hectares was at 92% GM. GM soya beans were planted at a 95% adoption rate on 508 000ha (552 000

in 2014). The amount of biotech cotton planted was 12 000ha, 100% GM (8 000ha in 2014).

As a result of biotech crops, the economic gains for local farmers from 1998 to 2014 are estimated at US\$1,8 billion and US\$245 million in 2014 alone (Brooks & Barfoot). Dryland yields of maize before the advent of GM averaged 1,5t/ha. Today average yields are at 5t/ha for GM maize, representing an increase of 70%. The GM maize yield under irrigation varies from 12 to 20t/ha.

According to Wandile Sihlobo, economist at Grain SA, South Africa is likely to spend between R13 billion and R14 billion between May this year and April 2017 to import 3,8 million tons of maize in order to meet the shortfall experienced due to the drought.

It is interesting to note how much more maize the country would have had to import were it not for the advent of the latest biotechnologies brought about by genetically modified organisms (GMOs) and modern maize germplasms.

The 1991/92 season was the last drought South Africa experienced before the adoption of GM crops. In that year the average maize yield was 0,85t/ha. The 2014/15 and 2015/16 seasons have both been recorded as drought-stricken years. With the adoption of GM maize, the average yield today is estimated at 3,72t/ha.

If it were not for GM maize and our yield was still at 0,85t/ha, we would have produced only 1,65 million tons of maize.

In order to meet our local demand, we would have had to import 9,4 million tons instead of 3,8 million, at an estimated additional cost of R33 billion.

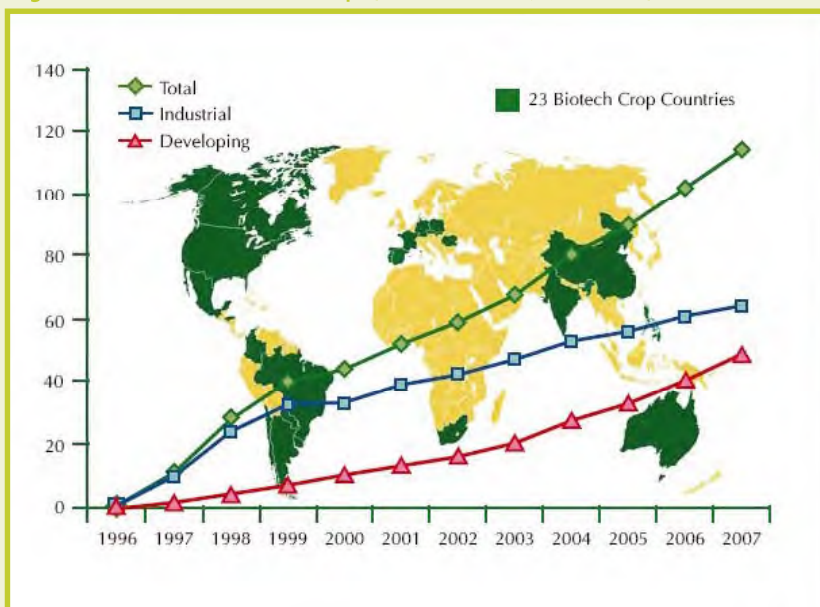
Drought-tolerant maize

The first Water-Efficient Maize for Africa (WEMA) Drought Tego™ WE 3127 conventional white maize hybrid was launched by the Agricultural Research Council (ARC) in the 2014/15 season for planting by smallholder farmers in five provinces. In Limpopo, yields increased from an average of 0,6 to 1,4t/ha. In the North West, four smallholders increased their yields from 1,5 to an average of 2t/ha. A biotechnological drought-tolerant maize hybrid is expected to be launched in 2017.

Tepsy Ntseoane, a smallholder farmer and president of the African Farmers' Association of South Africa (Afasa) for the Gauteng province, planted 40ha of GM maize dryland and increased her yield from 2,3 conventional to 7t/ha.

Researchers at Purdue University in the United States (US) have calculated what the world would look like if GM crops were removed from agriculture in the US. Their conclusion was that maize yields could drop by 11,2 and soya bean yields by 5,2%. More dramatically, cotton yields could drop by 18,6%. To fill these voids, 250 000 acres of US forests, pastures and 2,7 million acres globally would need to be converted to cropland. In addition, commodity prices would rise drastically – maize by 28% and soya beans by 22%.

Figure 1: Global area of biotech crops (million hectares, 1996–2007).



Increase of 12%, 12,3 million hectares between 2006 and 2007.
Source: Clive James, 2007

Adoption of GM crops in Africa is making good progress. Confined field testing of GM crops is currently underway in Burkina Faso, Cameroon, Egypt, Ghana, Malawi, Nigeria, Swaziland and Uganda. Biotech cotton is already being successfully grown in Burkina Faso and Sudan. In 2015, Sudan increased its biotech cotton by 30% to 120 000ha (90 000ha in 2014). Egypt has also produced some GM maize in the past, but is not planting at present.

Not a single incident

The safety of GM crops, including food and feed derived from it, is underscored by the millions of farmers worldwide who have planted these crops continuously for 20 years. Not a single incident of adverse effects to humans, animals or the environment, anywhere in the world, has been recorded. Yet, for the past 20 years anti-GMO activists continue claiming, without substantiated medical or scientific evidence, that GM crops are a threat to human and animal health and the environment.

One of the most critical campaigns, targeting glyphosate – the world's market leader herbicide for more than 40 years in 130 countries – claimed it to be "carcinogenic". However, the

European Food Safety Authority (EFSA) has rejected this claim outright, stating that: "Glyphosate is unlikely to pose a carcinogenic hazard to humans". Canada Health followed with a similar assurance, "that glyphosate does not pose a health risk to farmers and other occupations that handle the product". Scores of scientific institutions globally concurred.

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An outcry in the European Union (EU) to ban the product was rebutted by the EU parliament on 13 April, 2016, who voted that glyphosate should be authorised for the next seven years. Globally in 2012, glyphosate was used on 120 million hectares of GM and non-GM crops.

Latin America

Ten countries in Latin America grew biotech crops in that year. In 20 years, Argentina approved 20 GM crops.

European Union

Five EU nations planted 116 870ha GM crops. Spain led with 107 749ha in 2012. Spanish farmers reported an additional gross margin of €11 million for Bt maize in that year. Of the 28 EU countries, 19 have banned GM crops. They do not plant it, but import more than 33 million tons of soya beans from the US, Brazil and Argentina, which is 90% GM used in 7 000 food ingredients in addition to animal feed.

These nations are strongly food labelling-minded. Ironically, 10 million tourists from the EU visit the US annually, where 80% of the food is GM-derived, but they do not enquire regarding labelled menus when travelling.

Global plantings

Globally in 2015, some 18 million farmers in 28 countries planted 179,7 million hectares of GM crops (181,5 million in 2014). The 1% decrease was due to droughts in various regions and that major biotech countries, including South Africa, had reached saturated adoption in most GM crops.

However, strong growth is expected in developing countries. In 20 years, GM planted land grew from 1,7 million in 1996 to 179,7 million in 2015 globally. It is estimated that in these 28 nations, farmers have benefitted by the US\$150 billion derived from GM crops (Brooks & Barfoot).

Several new approvals for GM crops have been registered in the US, mainly in respect of fruit, potatoes and lucerne. The first GM animal has also been approved – a faster-growing salmon. It is expected to enter the food chain in 2018. Atlantic salmon normally takes three years to harvest on fish farms, compared to only 18 months, or half the time, for GM salmon.

Presentation by Andrew Bennett, chairman of the South African Agricultural Biotechnology Industry (ABI), at the annual ABI media conference held in Pretoria on Tuesday, 3 May 2016. For more information, contact Bennett on 082 316 2197 or 011 790 8213. 📞