Moving into the Future

Responsible and safe deployment of modern biotechnology can significantly enhance prospects for alleviating poverty and hunger in Africa. To realize the technology’s potential, however, African governments should create an enabling policy environment and conducive institutional arrangements for investment in R&D and commercialization of these products. Mechanisms to facilitate access to proprietary technologies and to invigorate the public sector toward development of products relevant to local conditions should be strengthened.

One of the major constraints to acceptance of modern biotechnology in Africa is misinformation. This continues to influence adoption and policy choices. Generation of accurate and science-based information is therefore crucial to informed decision-making, which would lead to greater appreciation of the contributions of biotechnology to food security and wealth creation.

References

The Role of Agricultural Biotechnology in Hunger and Poverty Alleviation for Developing Countries 2006. By: Prof. M.O. Makinde, Prof. J. R. Webster, Mr. N. Khumalo & Dr. D. P. Keetch.

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The Case for Modern Agricultural Biotechnology

Biotechnology enables diverse applications in agriculture, health, industry and the environment. Overwhelming evidence demonstrates that biotechnological tools — tissue culture, genetic engineering and molecular breeding (marker-assisted selection) continue to provide promising opportunities for achieving greater food security while improving the quality of life. Biotechnology however is not a magical bullet. A high quality seed requires good agronomic practices, appropriate inputs and support services for the farmer to reap benefits. The comparative advantage of currently available biotech crops is the built-in defense against insects and tolerance to weed killers making them suitable for the average farmer. The technology is scale neutral and with proper stewardship, even the very small farmers benefit.

Experiences and Evidence from Africa

As of 2017, South Africa and Sudan were the African countries with commercialized biotech crops.

<table>
<thead>
<tr>
<th>Country</th>
<th>Biotech Crop Area (million hectares)</th>
<th>Commercialized Biotech Crops</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Africa</td>
<td>2.730</td>
<td>maize, soybean, cotton</td>
</tr>
<tr>
<td>Sudan</td>
<td>0.192</td>
<td>cotton</td>
</tr>
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</table>

Biotech cotton, maize, and soybean occupied 2.73 million hectares of land in South Africa in 2016, a 2.6% increase from the reported biotech crop area of 2.66 million hectares in 2016. Average biotech crop adoption increased marginally at 93% in 2017.

Sudan has been planting Bt cotton since 2012. Some 192,000 hectares of Bt cotton were planted in 2017, up from 120,600 hectares in 2016. This was a major breakthrough in the cotton industry of the country because cotton production has been declining in the past couple of years due to bollworm infestation.

Global Status and Trends in Modern Biotechnology

Globally, in 2017, biotech crops occupied 189.8 million hectares, grown by ~17 million farmers in 24 countries (19 developing and 5 developed countries). The global area under biotech crops has increased at 1.7 million hectares in 1996 to 189.8 million hectares in 2016 (a ~112-fold increase).

Other global milestones:
• The net farm economic benefit in developing countries in 2016 was US$18.2 billion.
• An 18.3% reduction in environmental impact of insecticides and herbicides has been recorded in 2016.
• Two European countries – Spain and Portugal continued to grow commercial biotech crops in 2017.

Health Benefits of Biotech Crops

Besides reduction in pesticide residues, biotech crops have potential to increase the nutritional value of foods and enhance human health in various ways:
• Lower levels of infestation by insects reduces fungal and mycotoxin in maize.
• Nutritionally enhanced rice for beta carotene, would provide an alternative source of vitamin A to save millions of children who go blind every year.
• Biotech processes can reduce presence of toxic compounds - e.g. cyanide in cassava.

Environmental Benefits of Biotech Crops

• Global cumulative reduction in pesticides usage is estimated at 671 million kg of active ingredients for the period 1996-2016. This has contributed to reduction of pesticide residue in foods and minimized impact on non-target organisms.
• Increased productivity per unit of land, minimizing encroachment into marginal lands, destruction of forests and pollution of freshwater resources.

Progress of Biotech Crop Research in Africa

In 2017, a total of 13 countries in Africa sustained various activities from planting, evaluating trials or granting approvals for the general release of various biotech crops. Other research highlights in 2017-2018:
• Swaziland completed the evaluation of an environmental release application for IR cotton, which was eventually approved for commercial planting in 2018.
• In 2018, Ethiopia authorized cultivation of biotech crops by granting two landmark approvals for environmental release of Bt cotton and research trials on biotech maize.
• Mozambique planted the first field trial of biotech maize (with insect resistance and drought tolerance traits) as part of the Water Efficient Maize for Africa (WEMA) program.
• Six countries continue to conduct multi-location trials in preparation for general release: Burkina Faso (cowpea), Ethiopia (cotton), Ghana (cowpea), Kenya (maize), Nigeria (cowpea and cotton), and Uganda (banana, maize, and potato).

Safety of Biotech Crops

With over a decade of production and consumption, biotech food and feed products depict a history of safe use with no credible evidence of risks to human health or the environment. This has been confirmed by a number of reputable independent scientific bodies such as the National Academies of Sciences, Engineering, and Medicine (U.S.), Research Directorate General of the European Union, the French Academies of Sciences and Medicine and the British Medical Association.

In May 2004, the Food and Agriculture Organization (FAO) of the UN reported: “to date, no verifiable untoward toxic or nutritionally deleterious effects resulting from the consumption of foods derived from genetically modified foods have been discovered anywhere in the world.”