

KENYA TOP TEN FACTS ABOUT AGRI-BIOTECH & BIOSAFETY BY 2016



FACT 1

Kenya was the first Country to Sign the Cartagena Protocol on Biosafety



Former President Daniel Arap Moi signing the Cartagena Protocol

1. The former President Daniel Arap Moi signed the international treaty governing the movement of living modified organisms resulting from modern biotechnology from one country to the other during the 5th Conference of Parties in May 2000 at UNEP headquarters, Nairobi. The country ratified the Protocol in 2003.
2. The Protocol's objective is to contribute to ensuring an adequate level of protection in safe transfer, handling and use of living modified organisms resulting from modern biotechnology that may have adverse effects on the conservation and sustainable use of biological diversity, taking into account risks to human health and specifically focusing on trans boundary movements.
3. The Cartagena Protocol in Biosafety to the Convention on Biological Diversity laid down the necessary platform for implementation of National Biosafety Frameworks and establishment of effective biosafety management systems.

You can download the Protocol from:

<https://www.cbd.int/doc/legal/cartagena-protocol-en.pdf>

Kenya Approved a National Policy on Biotechnology Development in 2006

FACT 2

1. The Kenya government's vision and commitment towards promotion and application of biotechnology is articulated in the National Biotechnology Development Policy that was endorsed by Cabinet in 2006.
2. This policy outlines the government's commitment to safe development and deployment of biotechnology for socio-economic development.
3. The policy charts a vision towards the development and safe application of biotechnology, to guide research and commercialization of modern biotechnology products in the country.

You can download the policy from:

http://en.biosafetyscanner.org/pdf/doc/350_allegato.pdf



Former president Mwai Kibaki opening a state of the art GM research lab in the country

FACT 3

Kenya Enacted its Biosafety Act in 2009



Former Minister for Higher Education, Science and Technology Hon. Prof. Margret Kamar (left) launching the NBA five-year strategic plan

1. The Kenya Biosafety Bill was drafted in 2005. After several years of stakeholder consultations and parliamentary debates, the Bill was eventually passed by Parliament in 2008, and enacted into law on 12th February 2009 as Biosafety Act No. 2 of 2009.
2. The Act's primary goal is to ensure that Kenya maximizes the benefits of modern biotechnology while safeguarding against any potential risks to human health and adverse effects to the environment.
3. The Act lays down legal and institutional frameworks for governing modern biotechnology in the country. So far, Kenya is the only African country to have used its own domesticated biosafety law to grant decisions on applications for open field cultivation of GM crops.

You can download the act from:

<http://africenter.isaaa.org/wp-content/uploads/2015/07/Biosafety-Act-No.2-of-2009.pdf>

The National Biosafety Authority was Officially Launched in May 2010

FACT 4

1. The National Biosafety Authority (NBA) was established through a provision of the Biosafety Act 2009, as the competent authority to provide overall supervision and monitoring of GMO research and commercialization activities.
2. To achieve its mandate, the authority works closely with eight regulatory agencies:
 - I. Kenya Plant Health Inspectorate Service
 - II. Directorate of Veterinary Services
 - III. Department of Public Health
 - IV. Kenya Bureau of Standards
 - V. National Environment Management Authority
 - VI. Kenya Wildlife Services
 - VII. Kenya Industrial Property Institute
 - VIII. Pest Control Products Board
3. As of August 2017, the authority had handled a total of 74 applications in four categories of GMO activities.

GMO applications handled by NBA as of August 2017

	Approved	Pending	Total
Lab/Greenhouse Trials	26	3	29
Confined Field Trials	14	0	14
Environmental Release	2	1	3
Imports and Transit of GM Products	28	0	28
Total			74

FACT 5**The National Biosafety Authority has Published Four Sets of Biosafety Regulations**

Education Cabinet Secretary Dr. Fred Matiang'i and the chair NBA board Dr. Mary Amuyunzu-Nyamongo launching the labeling regulation for GM products

1. The four regulations as stipulated in the Kenya Legislative Supplements of the Biosafety Act, 2009 are:
 - I. The Environmental Release Regulations (2011)
 - II. The Import, Export and Transit Regulations (2011)
 - III. The Contained Use Regulations (2011)
 - IV. The Labeling Regulations (2012)
2. The four regulations ensure:
 - I. Potential adverse effects to human health and environment are addressed upon open cultivation of GM crops.
 - II. There is safe movement of genetically modified materials in and out of the country.
 - III. Research on genetic modification is done under containment.
 - IV. There is efficient tracking of GM products in the food supply chain and information availed to the consumer.
3. Today, the first three regulations of the year 2011 are operational, the labeling regulation of the year 2012 will come into place upon commercialization of GM crops in the country.

Kenya is one of the Ten African Countries that Continued to Conduct Field Trials on Biotech Crops in 2016

FACT 6

1. Kenya is steadily gearing towards commercialization of GM crops. As of 2016, the country had undertaken confined field trials (CFTs) on various crops; insect resistant cotton, drought tolerant maize, insect resistant maize, virus resistant cassava, virus resistant sweet potato, bacterial wilt resistant banana and biofortified sorghum.
2. Most of the trials are on important food security crops focusing on traits of high relevance to challenges facing the country. The trials are conducted collaboratively with the premier Kenya Agricultural and Livestock Research Organization (KALRO).
3. The National Biosafety Authority has given conditional approvals for environmental release to Bt-WEMA maize and Bt cotton. Plans to conduct National Performance Trials for both crops are underway.



KALRO Director General Dr. Eliud Kireger (second right) during a field visit to a GM cassava experimentation site

Status of Confined Field Trials in Kenya in 2016

Crop	Trait	Institutions Involved	Confined Field Trial Stage as of December 2016
Maize, <i>Zea mays</i> L.	Drought tolerance (WEMA)	AATF, CIMMYT, KALRO	CFT – 6 th Season completed
	WEMA Insect resistance (Bt maize-MON810)	AATF, CIMMYT, KALRO	Conditional Approval for Environmental release; awaiting National Performance Trials (NPTs)
	Stack maize event for Bt (MON 810) and Drought (MON 87460)	AATF, CIMMYT, KALRO	1st season CFT completed
Cotton, <i>Gossypium hirsutum</i> L.	Insect resistance	KALRO, Monsanto	Conditional Approval for Environmental release; awaiting National Performance Trials (NPTs)
Gypsophila, <i>Gypsophila paniculata</i>	Pink Coloration of Petals	Danziger – “Dan” Flower Farm, Israel	Review for Environmental release
Cassava, <i>Manihot esculenta</i> Crantz	Cassava Brown Streak Disease Introgression into CMD tolerant background materials	KALRO, Danforth Plant Science Center (DDPSC)	1st season CFT completed, Regulatory trial ongoing - 1st season
	Cassava Brown streak virus (CBSV) and African Cassava Mosaic Virus (ACMV)	Masinde Muliro University of Science and Technology (MMUST)	CFT - 1st season completed
Sweet potato, <i>Ipomoea batatas</i>	siRNA resistance to Sweet potato virus disease	KALRO-Kakamega, Danforth Plant Science Center (DDPSC)	1 st season CFT completed
Banana	Banana bacterial – <i>Xanthomonas</i> Wilt (BXW) resistance	KALRO, IITA	1 st season CFT ongoing
Sorghum (ABS), <i>Sorghum bicolor</i> Moench	Enhanced pro-Vit. A levels, Bio-available Zinc and Iron	Africa Harvest, Pioneer Hi-Bred, a DuPont business and KALRO	CFT – 7 th Season completed

Acronyms

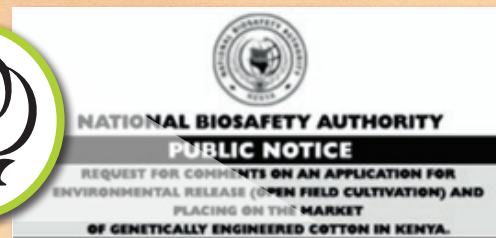
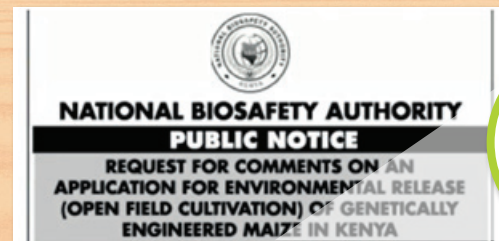
- AATF - African Agricultural Technology Foundation
- DDPSC - Donald Danforth Plant Science Center
- CIMMYT - International Maize and Wheat Improvement Center
- IITA - International Institute of Tropical Agriculture

- KALRO - Kenya Agricultural and Livestock Research Organization
- MMUST - Masinde Muliro University of Science and Technology
- WEMA - Water Efficient Maize for Africa

By 2016, three applications for open field cultivation of GM maize, cotton and Gypsophila flower had been processed

FACT 7

1. In February 2016, NBA granted conditional approval for open cultivation of Bt-WEMA maize. In Kenya, stem borers reduce maize production by 13% or 400,000 tonnes, equivalent to the normal yearly amount of maize the country imports.
2. In September 2016, NBA granted conditional approval for open cultivation of Bt cotton. With the current sink in the cotton industry, only 5 out of a total 22 ginneries are operational, producing an average of 25,000 bales against a yearly demand of 200,000 bales with the deficit covered through imports.
3. An application for open cultivation of GM Gypsophila, an ornamental flower grown for export which was submitted by Israeli company Imaginature Ltd. is under review.



FACT 8**Kenya has the Scientific Infrastructure and Human Capacity Needed to Develop GM Crops**

A scientist working in a GM research lab at BecA, ILRI

1. Kenya has the infrastructure and capacity needed for research and regulation of biotech crops. Currently, there are over 100 scientists engaged in research and development (R&D) activities countrywide, with 45% of these scientists working in the public sector. Biosafety facilities for modern biotechnology include a Level II Greenhouse at the Kenya Agricultural and Livestock Research Organization (KALRO) and the Plant Transformation Laboratory at Kenyatta University.
2. National universities have established strong research programs for training young scientists on modern biotechnology. They include, among others:
 - I. Kenyatta University
 - II. Jomo Kenyatta University of Agriculture and Technology
 - III. Masinde Muliro University of Science and Technology
 - IV. University of Nairobi
 - V. Egerton University
 - VI. University of Eldoret
3. The country hosts various international research organizations under the CGIAR group working on GM research and is home to the Biosciences eastern and central Africa (BecA) regional hub, a world-class research facility nestled at the International Livestock Research Institute (ILRI).

Kenya has a well-structured Mechanism for Creating Awareness on Biotech Crops

FACT 9

1. In September 2008, the government launched a National Biotechnology Awareness Strategy (BioAWARE), a platform aimed at improving public understanding and awareness on biotechnology.
2. The International Service for the Acquisition of Agri-biotech Applications (ISAAA) AfriCenter pioneered awareness creation activities in the early nineties. Over the last decade, together with the African Agriculture Technology Foundation through OFAB, the AfriCenter continues to be at the forefront in raising awareness on agricultural biotechnology.
3. Other organizations involved in awareness creation initiatives include the African Biotechnology and Stakeholders Forum (ABSF), Africa Harvest, various universities under the Kenya University Biotechnology Consortium (KUBICO), as well as the private sector, mass media and several civil society groups.

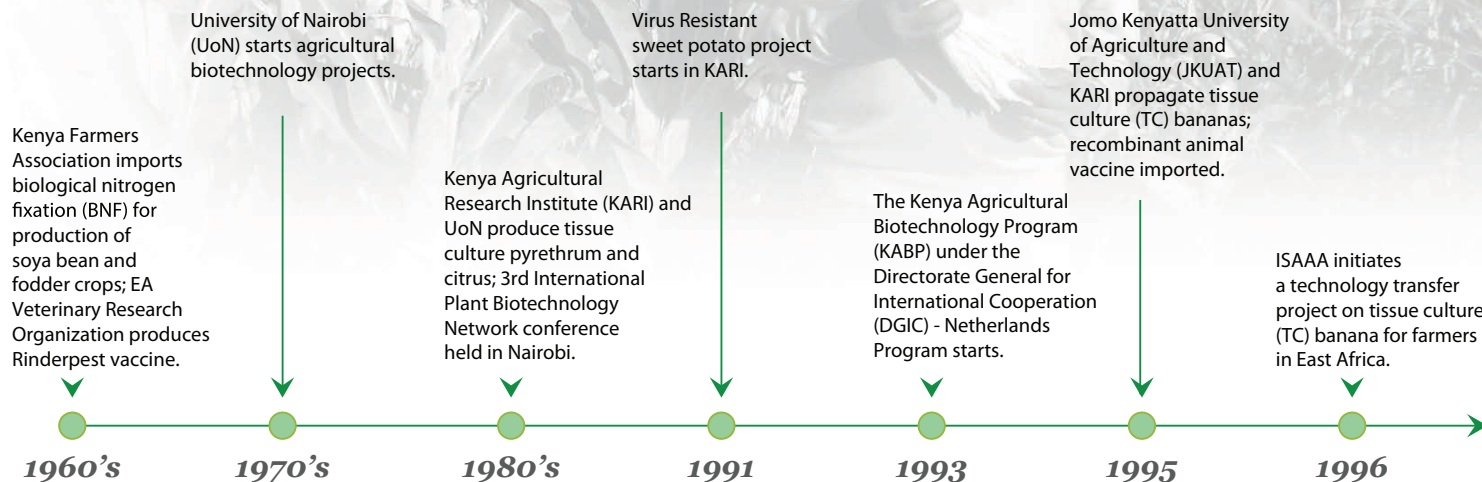


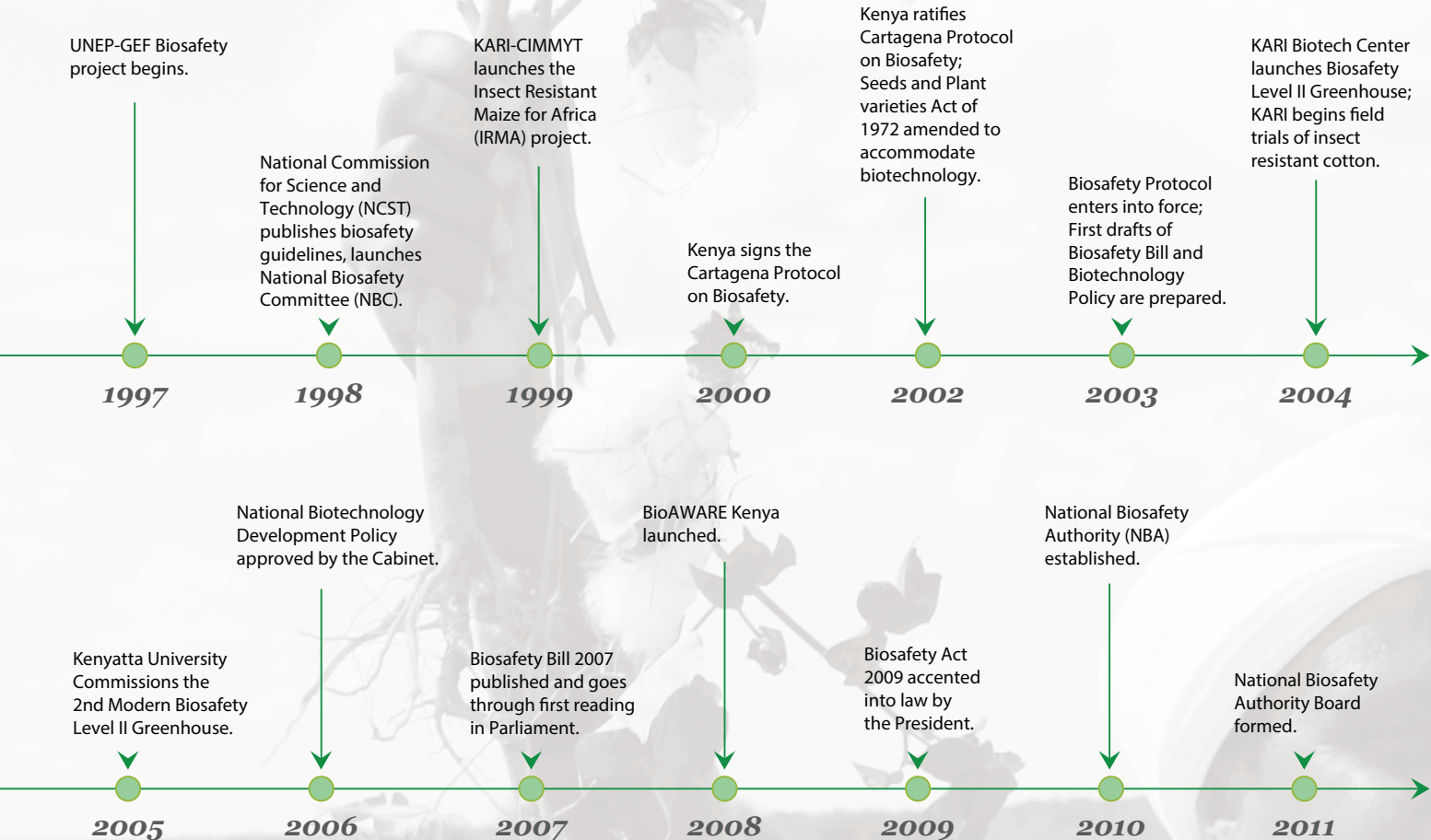
Hon. Sabina Chege (4th right), Chairperson of Departmental Committee on Education, Research and Technology with other Kenyan MPs on a biotech study tour in the country

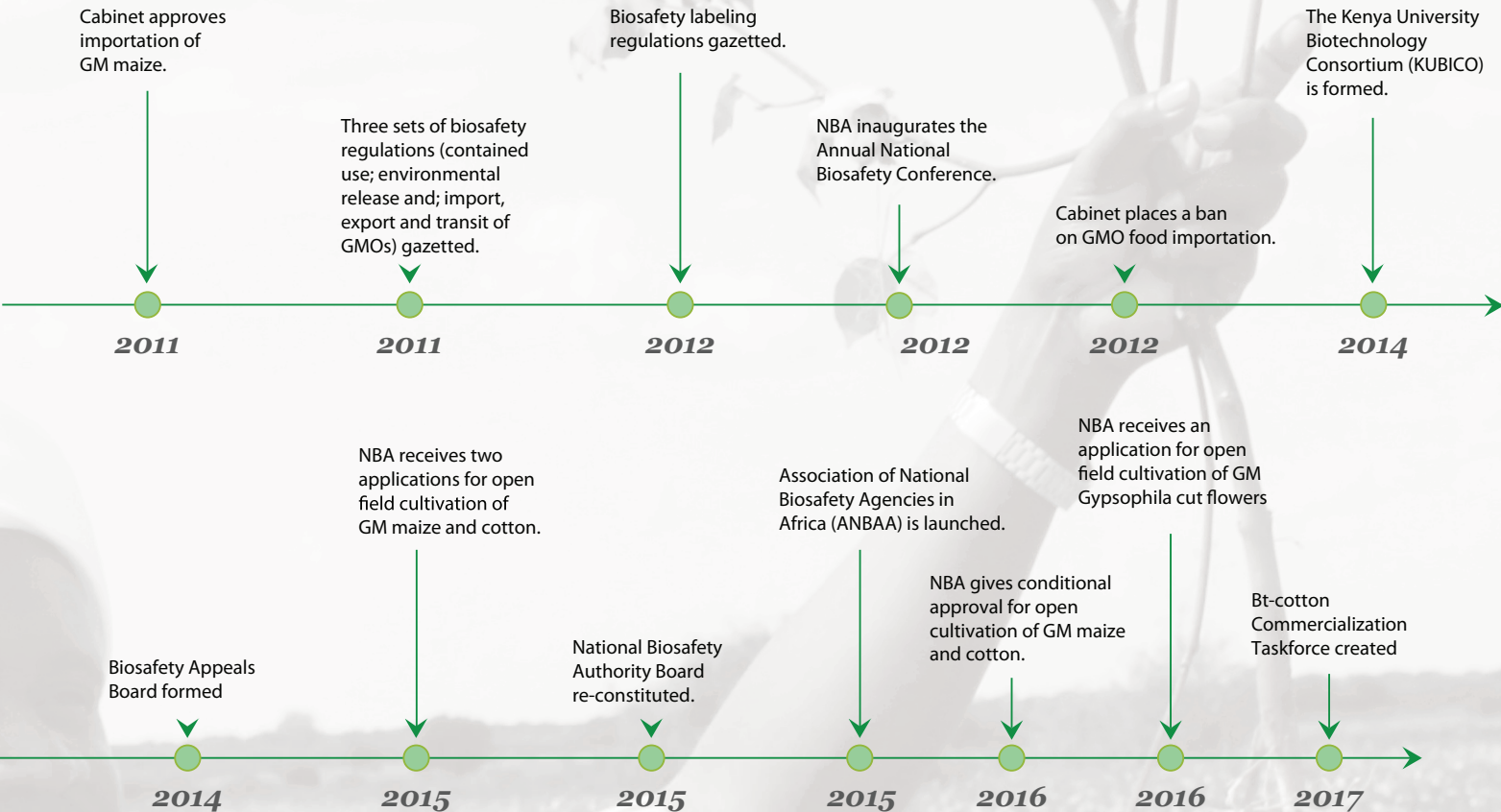
FACT 10**Kenya needs to Position Herself to Benefit from New and Emerging Technologies in Agriculture**

1. The global increase in income benefits for farmers growing biotech cotton between the year 1996 and 2015 was US\$52 billion. Only two African countries (South Africa and Sudan) were able to share in these benefits. During the same period, the global increased revenues achieved from planting biotech maize was US\$50 billion. Again, only South Africa benefitted from these revenues at the time when over 300 million Africans who depend on maize as a staple were denied the choice to adopt biotech crops.
2. The 1st and the 2nd generation of biotech crops mainly focused on single and stack traits for herbicide tolerance, disease/insect resistance and reduced production costs. Today, the world has moved on to new crop breeding tools like genome editing with the 3rd generation focusing on developing output traits for improved nutritional quality and composition, increased yield as well as reduced post-harvest damage. Biotech soybean improved through genome editing for delayed flowering resulting in increased vegetative size is such an example.
3. With robust regulatory frameworks on biotechnology and biosafety already in place, Kenya should align herself to tap into the benefits arising from incorporating these new agri-biotech tools into the agricultural system for sustainable food production and wealth creation.

Milestones in Agricultural Biotechnology and Biosafety Development in Kenya









ISAAA AfriCenter
 ILRI Campus, Old Naivasha Road,
 P.O.Box 70-00605,
 Uthiru, Nairobi, Kenya.
 Tel: +254 20 4223618,
 Fax: +254 20 4223634
 Email: africenter@isaaa.org
 Website: www.africenter.isaaa.org



OPEN FORUM ON AGRICULTURAL
 BIOTECHNOLOGY IN AFRICA

AATF
 ILRI Campus, Old Naivasha Road,
 P.O.Box 30709-00100,
 Nairobi, Kenya.
 Tel: +254 20 422 3700,
 Fax: + 254 20 422 3701
 Email: ofab@aatf-africa.org
 Website: www.aatf-africa.org

*Karembu M. and F.Nguthi (2017) Top Ten Facts about Agri-biotech and Biosafety in Kenya by 2016.
 International Service for the Acquisition of Agri-biotech Applications (ISAAA AfriCenter), Nairobi Kenya.*