

- To realize fast and meaningful economic benefits from medical biotechnology, the government will focus on the following areas:
 - Basic and applied research in bioinformatics, molecular and cellular biology, genomics, proteomics, stem biology (strictly using ethically obtained stem cells only), and other new platform biotechnologies as appropriate;
 - Development of molecular diagnostics, recombinant vaccines, and drug delivery systems.

5. Medical Biotechnology

- Applications requiring use of modern biotechnology for all purposes, will be subject to approval by the designated authority.
- To realize fast and meaningful economic benefits from medical biotechnology, the government will focus on the following areas:
 - Monitoring of environmental pollution
 - Eco restoration of degraded habitats
 - Afforestation and reforestation,
 - Bioremediation of wastes
 - Control of biological invasions
 - The potential for value-added products from biomass

4. Environmental Biotechnology



Kenya Biotechnology Development Policy Highlights

GLOBAL KNOWLEDGE CENTER
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1. Prioritization and Coordination of Research and Development

- The policy recommends establishment of a National Biotechnology Enterprises Programme that will consist of a National Commission on Biotechnology, a National Biotechnology Education Centre and a National Biosafety Authority.
- A National Biosafety Authority will be responsible for safe acquisition, development and commercialization of biotechnology and its products thereof. The implementation body and will work together with other government regulatory bodies to ensure adherence to laws and regulations.
- The National Biotechnology Education Centre will:
 - Coordinate and facilitate training and knowledge-sharing
 - Develop and maintain bioscience research, innovation and biotechnology database
 - Develop and maintain a National culture collection
- Functions of the National Commission on Biotechnology will be to consolidate and maximize on available resources of institutions engaged in training and R&D through:
 - Identification and implementation of national priority areas for R&D
 - Provision of advice/guidance on and/or supervision of the allocation of primary resources and responsibilities to public R&D institutes and universities
 - Tracking and evaluation of inventions, patents and commercialization of discoveries of R&D centers of excellence and the private sector.
- Key priority areas will be to:
 - Develop initiatives that will attract major investment in biotechnology research and product development from local and international companies or institutions.
 - Promote industrial skills development.
 - Provide a conducive environment for small and medium size biotechnology products businesses.
 - Ensure high quality standards, competitiveness of products on local and international markets.
- Development of traditional herbal medicines into superior industrial therapeutic products
- Screening of biodiversity components for bioactive compounds for value added therapeutic products.
- The policy outlines any activities or research dealings involving human cloning, use of unethically procured stem cells, and the introduction, use or release of the "Terminator Technology" and associated products into Kenya.

6. Industry and Trade

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Pocket Ks are Pockets of knowledge, packaged information on crop biotechnology products and related issues available at your fingertips.

They are produced by the global Knowledge Center on Crop Biotechnology (<http://www.isaaa.org/kc>). For more information, please contact the International Service for the Acquisition of Agri-biotech Applications (ISAAA) SEAsiaCenter c/o IIRRI, DAPO Box 7777, Metro Manila, Philippines
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APPLICATIONS

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Conclusion

The policy defines a road map for biotechnology and should effectively guide the country into a pre-eminent position of a knowledge-based economy for overall sustainable economic growth, poverty alleviation and wealth creation.

It pronounces the Government's commitment to provide an enabling environment for the acquisition and development of biotechnology responsibly for speedy exploitation of the immense potential in agriculture, environment, bioresources, health and industry.

Furthermore, the Government will ensure that information on the development and use of the bio-technology is accurately and transparently disseminated to the public and industry to allow informed choices on its application while respecting their traditional methods of production.

For more information: Biosafety Office
www.biosafetykenya.co.ke

Production of this Pocket K is a collaborative initiative among the National Council for Science and Technology (NCST), Ministry of Agriculture The Program for Biosafety Systems (PBS) of IFPRI and ISAAA AfriCenter

- There are four basic elements to the principle of public awareness and participation that the Government will adopt:
 - Creation of public awareness on biotechnology issues and investment opportunities
 - Access to information held by public authorities;
 - Public participation in decision making process;
 - Access to judicial and administrative provisions.
- Protecting Intellectual Property Rights (IPR) is a critical aspect of biotechnology innovation, and ensuring effective public and private sector participation in research and product development.
- The Government recognizes the existing policies and legislation on protection of traditional knowledge and resources.

III. Public Protection and Support Key recommendations

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- The Government recognizes the existing policies and legislation on protection of traditional knowledge and resources.

IV. Infrastructure, Facilities and Equipment Key recommendations

- The National Biotechnology Enterprises Programme to put in place mechanisms to create linkages and networks among public research institutes and universities for optimum access and utilization of available resources.
- Enhancement of public/private partnerships.
- Support initiatives for the establishment of biotechnology parks at R & D institutions as incubators to stimulate the growth of small and medium size businesses with potential to mature into high technology companies.

V. Financial and Business Support Key recommendations

- Create incentives to encourage partnerships between public research institutes and universities, and the private sector for the purpose of attracting private sector investment in biotechnology based start up firms. Incentives include but not limited to subsidies on private sector capital investment and tax exemptions.
- Waiver of taxes on research materials and equipment
- Encourage specialized technological financing agencies to provide loans to firms or consortia and research institutions.
- Direct public budgetary allocation to biotechnology research and development.

Highlights of the Kenya National Biotechnology Development Policy.

Introduction

Biotechnology is any technological application that uses living organisms, or derivatives thereof to make or modify new products or improve existing ones. While advances in biotechnology have great potential to improve the economy, it is imperative that it be applied systematically, responsibly and in a way that responds to the country's priority needs. In this regard, the



government of Kenya has developed a comprehensive national policy to guide research, development and commercialisation of modern biotechnology products. The policy, which was approved in September 2006, has been the result of several years of work involving all major biotechnology stakeholders nationally, internationally and relevant government departments.

What does the Policy mean for Kenya?

The policy charts the vision of the Kenyan government towards the development and safe application of biotechnology. It provides those developing and applying the technology with a clear framework under which to operate.

The policy commits the government to give priority to the provision of relevant institutional, infrastructural and legislative framework and, in particular, the enactment of new legislation on biosafety.

Key Features of the Policy

The policy outlines six priority areas of focus

1. Agricultural Biotechnology

Under this, the Government will focus on the following priority areas:

- Biotechnologies to develop new plant varieties with beneficial genetic traits for pest and disease resistance, improved nutritional value, tolerance to drought and salinity. Special attention will be paid to conservation of germplasm of traditional and wild crop plants.
- Animal reproductive biotechnologies such as artificial insemination, embryo transfer, genetic improvement of local breeds, and somatic cell nuclear transfer (cloning) techniques. Special attention will be paid to the development of livestock that are resistant to diseases, have improved meat, milk or wool quality, can increase proteins in their milk or meat (biopharm animals), or which have characteristics that are environmentally friendly.
- New plant and animal diagnostic products, improved animal vaccines, biological pesticides, herbicides and fertilizers

What are the objectives of the Policy?

Some of the key objectives of the policy are to:

1. Prioritize, promote, and coordinate research in basic and applied bio-sciences.
2. Promote sustainable industrial development for production of biotechnology-derived products.
3. Create enabling administrative and legal frameworks for biotechnology development and commercialisation.
4. Develop mechanisms for the provision of sustainable funding for biotechnology research and products development.
5. Support and facilitate capacity building on all aspects of biotechnology including intellectual property access and protection, biosafety and bioethics.
6. Support the development and retention of human resources in science, innovation and biotechnology.
7. Stimulate collaboration among public, private sectors and international agencies in order to advance biotechnology both locally and internationally.
8. Promote public understanding of the potential benefits and address stakeholder concerns/issues on modern biotechnology.

Scope of the policy

The policy covers all biotechnology applications, including tissue culture and micro-propagation, biopesticides and biofertilizers, livestock technology, DNA Marker technology, and genetic engineering. It also covers research, development and use of biotechnology in various key fields such as agriculture, environment, human and animal health and industry. The policy takes cognizance of international instruments, such as the Cartagena Protocol on Biosafety.

2. Education

The government will pay particular attention to:

- Reviewing of curricula at all levels to promote the spirit of scientific inquiry by encouraging independent student projects, exposing students and teachers to biotech activities in Kenya and internationally through study tours, expert guest lectures; and promoting acquisition of entrepreneurial skills.
- Strengthening the teaching of biosciences at the formal education level.
- Attracting and retaining talent in biosciences.
- Developing scientific and related infrastructures.
- Spearheading formal and informal public education and awareness creation programs.

3. Bioresources

The Government will support the following priority activities for fast-tracking economic exploitation of biodiversity:

- The development of a centrally managed database on species in different ecosystems and the traditional knowledge associated with the species.
- Creation of research fund to facilitate molecular characterization and bioprospecting for novel products for development and industrial production.
- Establishment of national culture collection centers for the preservation and utilization of economically beneficial microorganisms.
- Accelerate the establishment of viable *in situ* and *ex situ* (Gene banks) conservation centers.
- Focused exploitation of fauna, flora and microbes in marine and extreme habitats for novel genes for development of osmo tolerant crops, enzymes, biopolymers, marine pollution biosensors, bioactive molecules, etc.