

## **Biotechnology in South Africa - A concise overview**

The ongoing adoption of improved technologies has enabled South Africa to move with the times in the fields of human health, environment, industry, and food production. This has enabled the country to raise, amongst others, its average yields per hectare almost five-fold in the case of maize, and four-and-a-half times in wheat, over the last 50 years.

Use of modern biotechnology include commercial virus elimination and plant production through tissue culture of date palms, banana, soybeans, dry beans, and others; animal artificial insemination, embryo transfers; human organ transplants, in vitro fertilization and embryo implants; and vaccine production for animal and human health. Application of advanced genetic technologies is manifested in diagnostics leading to human genetic counselling, fingerprinting and forensics. In plants it extends to variety identification and marker assisted breeding.

Genetic modification (r-DNA technologies) has been the subject of research, development and application over 20 years in South Africa.

### ***Regulatory Oversight***

Industry and academic scientists took the initiative to establish the South African Genetic Experimentation Committee (SAGENE) in 1978 to serve as watchdog and advisory body to scientists, industry and Government. Their biosafety guidelines were applied to all GM field trials since 1990.

The GMO Act, passed in 1997, controls all facilities where genetic modification research and development takes place, and all field trials, contained use, imports, exports, and commercial releases. The Plant Pests Act of 1983 was used before the GMO Act was implemented.

South Africa played an active part in development of the international Convention on Biological Diversity, and in the evolution of the Cartagena Biosafety Protocol which arose from provisions of this Convention. A new Biodiversity Act is presently in a draft stage.

Discussions between Government and a range of stakeholders have led to the publication of draft regulations for labelling of foodstuffs derived through genetic modification. This draft provides for mandatory labelling of food which differs significantly from conventional counterparts in nutritional value, composition, mode of storage, or levels of allergens and toxins; or if plant materials contain human or animal genes.

Voluntary labelling is available for negative claims, i.e. non-GM, subject to verification by an independent body, identity preservation and a 1% tolerance level. Positive claims for genetically enhanced/improved are also voluntary and must be substantiated by an independent body.

### ***Plant Biotechnology***

By the mid-nineties South Africa had some 110 plant biotechnology groups in research and development involving

over 160 projects.

Total annual investment is only some R100 million (USD 12 million). Some 45 companies make use of products of biotechnology in food, feed and fibre. Over 200 permits have been granted for contained and crop field trials since 1990. These covered cotton, maize, lucerne, eucalyptus, apple, canola, soybean, potato, sugarbeet, sugar cane, and arabidopsis.

Only in 1997 was the first permit for conditional commercial release granted, namely for Bt insect resistant cotton. This was followed in 1998 with approval for various yellow maize hybrids with Bt insect resistance. Recently, white Bt insect resistant maize was released, as well as herbicide tolerant cotton. Last year area under GM crops totalled some 200 000 hectares. Extensive evaluation of Bt insect resistant cotton showed significant benefits for small scale and commercial farmers under dryland and irrigation conditions.

### ***New Developments***

Acceptance by Government and industry of modern biotechnology has become evident from the forthcoming establishment of an Innovation Hub for modern technologies, a provincial Biotechnology Incubator, a Biotechnology Venture Capital Fund, and, finally, the draft Biotechnology Strategy.

The process for strategy development started with a directive by Cabinet to the Department Arts, Culture, Science and Technology, the contracting of a panel of experts, and management of the process by an inter-departmental steering committee.

The document highlights the need to obtain increased value from recent advances in biotechnology, stimulation of innovation, backed by education and capacity building with support from Government. The three focal areas specifically identified are human health, food production and the environment. The full text of the National Biotechnology Strategy can be accessed by visiting the internet homepages : [www.africabio.com](http://www.africabio.com) and [www.dacst.gov.za](http://www.dacst.gov.za).

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