



Annex

Methods

The following search methods have been applied to obtain primary data for the impact assessment on genetically engineered plants:

Questionnaire

To acquire primary data, a questionnaire was designed, which was applied to obtain specific information about transgenic crops used in South Africa. Answers to the questionnaire were obtained by personal interviews or by telephonic conversation. The questionnaire consisted of the following questions:

- What types of crops are already released commercially in South Africa?
- Who are the main customers?
- In which Province are the sales of hybrid seeds biggest?
- Do you only sell hybrid maize seeds or do you sell ordinary seeds as well?
- Of these two, which one is of higher demand and which is more profitable?
- What are the different traits of hybrid seeds you are selling?
- Is anyone doing research on the environmental impact of genetically engineered crops on the South African flora?



Personal Interviews

To obtain information about genetically engineered plants and possible environmental risks involved of growing genetically engineered plants the following persons were contacted in South Africa:

J. R. Webster: Executive Director of AfricaBio. Promotes research, development and application of biotechnology. Provided useful references and contact addresses. Helped to find out the companies in SA selling transgenic seeds

S. Moephuli: Director, Genetic resources, Department of Agriculture. Expertise in Biochemistry. Provided information about the Genetically Modified Organisms Act. The objective of the act is to promote the responsible development, production, use and application of GMOs. Helped assessing the existing bio safety regulations.

M. Koch: Director of innovation technology, Secretariat to the South African committee for genetic experimentation (SAGENE). Provided useful information and guidelines for the preparation of the questionnaire for the general release of genetically modified plants. Gave some website addresses that were very useful to find out the relevant information.

C.L. Bredenkamp: Assistant curator, National Botanical Institute, National herbarium Pretoria. Provided various literatures about cotton to find different species of cotton in South Africa.

C. Van Gneewe: Monsanto, conducting research, development and marketing of GM seeds. Responded to the questionnaire. Through his response locations in South Africa were identified where transgenic crops are currently planted.

J. Prinsloo: Agronomist, Pioneer Hybrid; Conducting research, development and marketing of seeds. Responded to the questionnaire and provided information on different traits of GMOs the company is selling.



Dr. Dave Berger: Lecturer, Department of Botany, University of Pretoria. Provided useful information about transgenic plants and website addresses.

Internet information

Database search

Most of the information obtained for methods of risk assessment was done by collecting secondary data visiting on the Internet the following databases:

- Ovid (<http://gateway.ovid.com>)
- Cambridge Scientific Abstracts (CSA)(www.csa2.com)
- AgbiotechNet (<http://www.agbiotechnet.com>)
- AgBioView (<http://www.agbioworld.org>)
- AfricaBio (www.Africabio.com)
- Agbiosafety (<http://www.agbiosafety.unl.edu>)
- CropBiotechnet (<http://www.isaaa.org/kc/>)

The following key words were used for the searches:

- Environmental impact
- Transgenic plants
- Risk and transgenic plant
- Herbicide resistance
- Gene Transfer



Website search

The following websites gave valuable information for carrying out a risk assessment for the impact of genetically engineered plants on the environment.

- <http://www.agbios.com>: AGBIOS is a Canadian company dedicated to providing public policy, regulatory, and risk assessment expertise for products of biotechnology.

Search Words: Gene transfer, weediness, herbicide tolerance

- <http://www.biotech-info.net>: This site covers all aspects of the application of biotechnology and genetic engineering in agricultural production and food processing and marketing.

Search Words: Environmental impact, Herbicide tolerance and insect resistance

- <http://www.isaaa.org/>: ISAAA is a small, responsive, non-bureaucratic international network with centers in developing and industrialized countries.

Search Words: Biotechnology problems and opportunities, Global status transgenic crop crops.

- <http://www.colostate.edu>: This is the homepage of Colorado State University; this site contains information conducted by their students on biotechnology. Discusses risks and concerns of transgenic products.

Search Words: Transgenic crops, current transgenic crops.

- <http://www.cgiar.org>: The CGIAR web site is a collaborative effort of many individuals. This site contains articles agricultural biotechnology.

Search Words: Biotechnology Developing countries.

- <http://genetech.csiro.au/>: The CSIRO site aims to provide scientific information about gene technology to the public.

Search Words: biotechnology benefits & risks

- <http://www.beyonddiscovery.org/content/view.article.asp?a=167>: This site contains detailed information on the genetic engineering of plants.

Search Words: transgenic plant, transformation techniques

- <http://www.agbiosafety.unl.edu/>: This site is maintained at the University of Nebraska-Lincoln with funding from the Council for Biotechnology Information, an

industry group. Of special note is the database of released transgenic crop varieties, with details on the genetic modifications and extensive information on food and environmental safety evaluations of each variety.

Search Words: gene transfer and weediness.

- www.agbioworld.org/: Brings the information about technological advances in agricultural in the developing world.

Search Words: 'biotechnology' and 'developing countries'. 'Biotech and Africa'

- <http://www.agbioforum.org/>: Publishes articles on scientific, economic, and public policy aspects of agricultural Biotech.

Search Words: biotechnology future benefits

- www.monsanto.com: Monsanto Company is a leading global provider of agricultural products and integrated solutions that bring together chemicals, seeds, and biotechnology traits to improve farm productivity and food quality. This site contains information about transgenic plants in various parts of the world and it has a good discussion group.

Search Words: Transgenic plant, Environmental safety

- www.syngenta.com: Syngenta is a world-leading agribusiness. The company ranks first in crop protection, and third in the high-value commercial seeds market. This site contains information on the protection of a variety of crops

Search Words: Herbicide benefits

Internet discussion groups

To obtain personal views on risks caused by genetically engineered plants on the flora the following discussion groups were joined:

- Monsanto Online Discussion Group (UK & Africa)
www.monsanto.co.uk & www.monsantoafrica.com
- Your Child Nutrition Source: Biotechnology Online Chat
<http://www.asfsa.org/continuinged/onlineed/chats/chat102501.asp>

Library information

A further source for secondary data was a thorough search of available books in the library of the University of Pretoria for the following information:

- Methods for risk assessment
- Herbicide resistant crops
- Plant genetic engineering
- Environmental Impact of transgenic crops.
- Transfer of engineered genes to wild relatives.

Maps were obtained from the National Botanical Institute in Pretoria.

Data storage

All Internet and library information on genetically engineered plants were stored in a ProCite database (Windows version 4.01 from Research Information Systems Carlsbad, CA 92009-1572 USA; <http://www.risinc.com>) allowing a query search. The personal database was screened for the relevant information and extracted information was used for preparing the thesis.