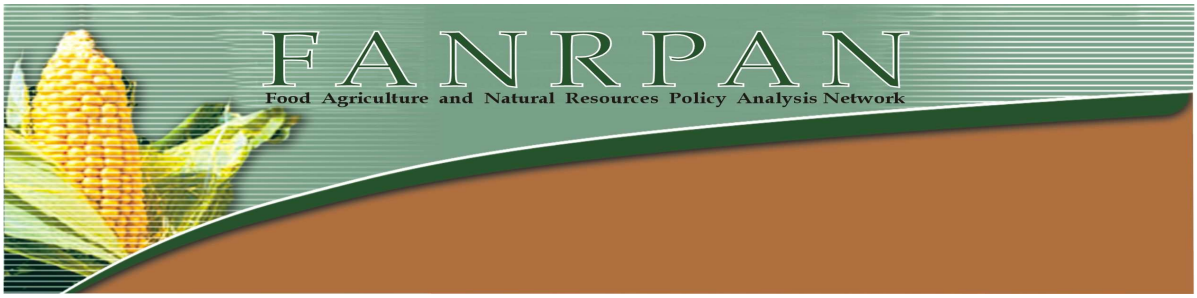

Food, Agriculture and Natural Resources Policy Analysis Network (FANRPAN)

Discussion Paper

Towards a Regional Approach to Biotechnology Policy in Southern Africa

Phase I: Situation Analysis and Stakeholder Views – Malawi

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September 2005

Acknowledgements

The work reported in this publication was made possible through support provided by the Regional Center for Southern Africa, U.S. Agency for International Development, under the terms of its Agreement with the International Food Policy Research Institute (IFPRI). The opinions expressed in this publication are those of the author(s) and do not necessarily reflect the views of the U.S. Agency for International Development, IFPRI or FANRPAN.

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ABSTRACT

This work is part of a bigger project which aims to document a balanced review of the technical information needed to guide SADC countries' biotechnology policy choices.

The general perception of GM crops among the respondents interviewed in Malawi is that genetic transformation has potential to improve food security, but they fear the risks to the safety of humans, animals and the environment. This situation is orchestrated by lack of public awareness due to insufficient information on the long-term effects of introducing GM crops into the country. The government position is that developments in scientific and technological fields elsewhere will affect Malawi and that the country cannot afford to remain behind in the GM revolution. However, there is a need to build capacity to manage and regulate the use of biotechnology in the country. Against this background, a comprehensive Biotechnology Policy is being prepared, which will include all aspects of biotechnology, GMO and bio-safety, social and ethical issues and all other concerns in environment, human health, ecology, plants and animals, industry, trade, food and nutrition, as well as cross-cutting issues.

LIST OF ACRONYMS AND ABBREVIATIONS

ANARMAC	Agriculture and Natural Resources Management Consortium
ARET	Agricultural Research and Extension Trust
ASC	Agricultural Sciences Committee
BCRC	Building and Construction Research Committee
BioEROC	Biotechnology-Ecology Research and Outreach Consortium
CAMA	Malawian Consumer Association
CBD	Convention on Biological DiversityConvention on Biological Diversity
CISANET	Civil Society Agriculture Network
CSIRD	Committee on Scientific and Industrial Research and Development
EU	European Union**Error! Reference source not found.**
FAO	Food and Agriculture Organization of the United Nations
FMU	Farmers Union of Malawi
GM	**Error! Reference source not found.**/genetic modification
GMOs	**Error! Reference source not found.**/genetically-modified-organism
GRBC	Genetic Resources and Biotechnology Committee
HACCP	Hazard Analysis Critical Control Point
ICRISAT	Malawi International Crops Research Institute for the Semi-Arid Tropics
IEC	International Electrotechnical Commission
IFDC	International Fertiliser Development Corporation IFDC/AIMs Project
IFPRI	International Policy Research Institute
IPRs	Intellectual Property Rights
ISTA	the International Seed Testing Association
LMOs	Living Modified Organism
LPPC	Legal and Patenting Policies Committee
MBA	Malawi Bio-safety Act, 2002
MBS	Malawi Bureau of Standards
MEJN	Malawi Economic Justice Network
MIRTDC	Industrial Research and Technology Development Centre
MT	metric tonnes
NADICC	National Documentation and Information Coordinating Committee
NASFAM	National Smallholder Farmers Association
NHBG	National Herbarium and Botanic Gardens
NHSRC	National Health Sciences Research Committee
NRCM	National Research Council of Malawi

OPC	Office of the President and Cabinet
OPVs	open-pollinated varieties
PELUM	Participatory, Ecological, Land Use Management network
R&D	Research and Development
RMO	Resource Mobilisation Office
RPC	Research Programmes Committee
SACUA	Southern Africa Confederation of Agricultural Unions
SADC	Southern Africa Development Community (Angola, Botswana, Democratic Republic of Congo, Lesotho, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia, Zimbabwe)
SCC	Science Competitions Committee
SPS	sanitary and phytosanitary
S&T	science and technology
STAM	Seed Trade Association of Malawi
UN	United Nations
USAID	United States Agency for International Development
WFP	World Food ProgrammeWorld Food Programme
WTO	World Trade Organisation

1. BACKGROUND

Fear of the unknown harmful effects on human, animal health and the environment of genetically modified (**Error! Reference source not found.**) food aid (maize) during the 2001/02 food shortage prompted the government to pass the Malawi Bio-safety Act (MBA) in 2002. The fear was heightened by a **Error! Reference source not found.**-wide rejection of consuming GM maize during a summit held in Maputo prior to taking delivery of the first USA GM maize consignment. The position on genetically modified organisms (GMOs) of the European Union (**Error! Reference source not found.**), one of Malawi's major donors in agriculture and food security, further consolidated the country's resolve to pass the MBA. The MBA provides for safe management of biotechnological activities. In specific terms, the Act can be applied to:

- regulation of genetic modification of organisms (plants and animals);
- importation, development, production, testing, use and application of GMOs;
- the use of gene therapy in animals, including humans.

The MBA provides for:

1. establishing a Bio-safety Fund [Part III] that will be used to support implementation biosafety activities in the country;
2. issuing biosafety licenses s and permits to stakeholders or applicants in various sectors of national development [Part IV]. This is intended to safeguard best management practices in the biotechnological system;
3. handling, transport, packaging and identification of GMOs and products thereof to avoid adverse effects on the environment [Part V];
4. promoting sales of genetically modified organisms [Part VI];
5. inspections of GMOs and products containing GMOs [Part IV];
6. miscellaneous provisions for secrecy, offences and penalties for offences and establishment of biosafety regulations [Part IX];

Consistent with the MBA, draft generic biosafety guidelines have been developed to guide the implementation of biosafety activities. However, sector-specific biosafety guidelines and regulations should be developed to address sector-specific biosafety requirements.

GMOs continued to be debated after the MBA was passed. On 17 July 2003, a majority of stakeholders observed that the Bio-safety Act (2002) had some implementation difficulties since it was hurriedly done because of the food crisis, and concluded that the country needed a sound policy and legislative framework for the management of GMOs and modern technology in general. For example, one of the participants observed that the name 'Biosafety Act' does not reflect the contents of the said act and further argued that the act should be renamed the GMO Act, as in other countries, to appropriately reflect its contents.

Subsequent consultative fora (12 November 2003, and 9–10 June 2004) further consolidated the resolution reached during the forum on 17 July, that the country should develop a comprehensive Biotechnology Policy that would include all aspects of biotechnology, GMO and bio-safety, social and ethical issues and all other concerns in ecology, environment, food and nutrition, human health, industry, plants and animals, and trade, as well as crosscutting issues. This recommendation was based on the premise that biotechnology encompasses more than biosafety and that the approach would avoid developing several pieces of legislation to address the same issue. Currently, the processing of the biotechnology policy is in its advanced stages. The final draft document is expected to be delivered for review by October 2005.

However, controversies surrounding GMOs emanate from lack of awareness and information about the positive and negative effects of consuming or introducing such products into the country. Although the process of developing the biotechnology policy has been open and transparent, debate on the effects of GMO technology may have been inadequate due to lack of background information and may have ignored and undermined the concerns of some stakeholders. Parallel investigation by the Food, Agriculture and National Resources Policy Analysis Network **Error! Reference source not found.** aims to enrich the process of consultation by providing additional information to certain groups of stakeholders in the country.

2. OBJECTIVES

The aim of this research activity is to collect data and information on a range of aspects pertaining to agriculture, biotechnology, genetically modified crops, trade, food security and bio-safety regulation and legislation with a view to contributing to the process of biotechnology development in Malawi. Results of this exercise will also contribute to a regional stakeholders' forum aimed at sharing information and experience on biotechnology policy development.

3. METHODOLOGY

The situation and stakeholders' analysis was based on primary data using a simple open-ended questionnaire and secondary sources of data. Primary information gathered details of individuals', institutions' and organisations' opinions and the positions of the stakeholders. Secondary data collected include a review of relevant literature and statistical publications on issues such as biotechnology, trade and food security in the country.

4. SITUATION ANALYSIS

4.1 Status of GMOs and Biotechnology Policy development

Currently, biotechnology is not being applied in any agricultural production system in Malawi, although the national policy recognises the potential of biotechnology to increase food security and alleviate poverty.

In a study by Manda (2002) on modern biotechnology and maize production, the majority of research scientists interviewed expressed support for the introduction of biotechnology, which is currently constrained by lack of trained manpower, finances and equipment. Manda observes that some three years ago (1999), an attempt was made to apply biotechnology to pest control at Chitedze Agricultural Research Station, but the lack of trained manpower and institutional support derailed the initiative. Some of the respondents felt that biotechnology is just too sophisticated for Malawi and that the government could not afford the equipment required for an effective programme to be launched. Others stated that biotechnology is not appropriate for Malawi due to problems of safety, apparently basing their opinion on information acquired through attendance at many workshops on the dangers of biotechnology (bio-safety workshops), emphasizing the need for awareness creation.

In spite of fears and reservations about the introduction of GM technology in Malawi, the general consensus among scientists and policy makers interviewed by Manda was that the country could not afford to remain behind the GM revolution. They contended that the fears originated from people from the rich countries of the north, who did not have food security problems. The respondents further argued that, in its life and death situation, Malawi could not afford to choose between GM and non-GM maize, whereas the European countries could afford to resist GM products because they had plenty of alternatives. They were able to

produce a large surplus with conventional technologies, unlike Malawi, where conventional methods of maize production have failed smallholder farmers.

The position taken by the scientific community raised enough enthusiasm amongst some researchers to initiate the process of capacity building in GM technology. Three scientists were attached to Don Danford Centre in the USA, one for three months and two for one week, during which they were exposed to the basics of GM technology and tissue culture. The training provided grounds for an application to the Regulatory Authority through the Department of Research and Technical Services in December 2004 for transgenic trials of cassava and the Cassava Mosaic Virus. The application went no further than the Ministry of Agriculture due to fears that Malawi was not ready for such an exercise. This underscores the importance of establishing a biotechnology policy to provide guiding principles and a strategic framework for addressing biotechnology issues in general and transgenic technology issues in particular.

4.2 The National Science and Technology Policy

Malawi developed a National Science and Technology Policy, endorsed by Cabinet in August 2002. The policy sets out objectives and strategies for building science and technology capacity in this country. Its overall goal is to attain sustainable socioeconomic development through the development and application of science and technology in order to improve the standard and quality of life of all Malawians. The general policy objectives are:

- to establish and strengthen national capacity to research, evaluate, select, acquire, adapt, develop, generate, apply, and disseminate technologies;
- to develop and raise the national productive capacity and improve competitiveness through the efficient application of technologies;
- to promote and develop traditional, endogenous, new and innovative technologies; and
- to create knowledge and awareness of science and technology, thereby improving and developing the scientific and technological culture of Malawians.

4.2.1 Policy strategies

The Policy recognizes the pervasive and converging nature of all the emerging technologies, such as Information and communication technologies and biotechnology. It spells out strategies for developing biotechnology in Malawi as follows:

1. establishing and strengthening centres of excellence in specific areas of biotechnology;
2. increasing awareness of biotechnology and its potential impact on socioeconomic development through demonstration and training centres;
3. intensifying the development of human resource capability in biotechnology;
4. establishing a national programme of action to promote the adoption of biotechnology;
5. establishing capacity to monitor and evaluate biosafety issues in the economy; and
6. establishing programmes for international cooperation in biotechnology.

4.2.2 The Science and Technology Bill (2002)

The Science and Technology Bill is the main legal instrument for facilitating implementation of the National Science and Technology Policy. Its main thrust is to establish the National Commission for Science and Technology and a Fund for the Advancement of Science and Technology in Malawi. The National Commission will be a governmental organization vested with overall responsibility for promoting the development and application of science and technology in this country. The Fund will be the main means by which the Commission will support science and technology programmes.

In relation to biotechnology, Clause 37 of the Science and Technology Bill (2002) makes it a requirement for anybody who wants to engage in biotechnology to seek consent from the Commission. It reads: *Notwithstanding the provisions of the Biosafety Act [No. 13 of 2002] and any other Act, no person shall engage in any matter related to biotechnology without prior consent of the Commission.*

4.2.3 Coordination of science and technology issues

The National Research Council of Malawi (NRCM) coordinates science and technology issues through subject specialist technical standing committees, of which the Council has nine:

- Committee on Scientific and Industrial Research and Development (CSIRD)
- Genetic Resources and Biotechnology Committee (GRBC)
- Legal and Patenting Policies Committee (LPPC)
- Agricultural Sciences Committee (ASC)
- Research Programmes Committee (RPC)
- Building and Construction Research Committee (BCRC)
- National Health Sciences Research Committee (NHSRC)
- National Documentation and Information Coordinating Committee (NADICC)
- Science Competitions Committee (SCC)

Because the GRBC and NHSRC have a very direct bearing on biotechnology, they have been briefly highlighted below.

4.2.4 The Genetic Resources and Biotechnology Committee

The GRBC, among other things, promotes and encourage endogenous development of biotechnology in areas where Malawi has a comparative advantage, and also fosters the dissemination of information on trends in biotechnology.

A. GRBC Terms of Reference

- To institute measures harmonious with relevant guidelines available in the country to ensure that collection of Malawi's genetic materials does not lead to loss of biological diversity and/or government revenue;
- To ensure that the importation of genetic resources (including genetically modified living organisms) and germplasm does not adversely affect the conservation and sustainable use of biological diversity;
- To ensure that genetic resources and germplasm are exchanged in such a way that Malawi benefits economically from whatever is exported;
- To encourage the establishment of gene banks and genetic data banks (*in-situ* and *ex-situ*) and the formation of strong links with the banks, including the SADC gene bank;
- To advise the government on which of the country's genetic materials should be protected against detrimental use by researchers, collectors and traders;
- To foster the dissemination of information on trends in biotechnology;
- To keep abreast of the national, regional and global trends in intellectual property rights and trade;

- To ensure that expatriate researchers work closely with competent Malawian researchers;
- To encourage and promote endogenous development of biotechnology in areas where Malawi has comparative advantage.

4.2.5 GRBC membership

The National Research Council is only a Secretariat to this broad-based Committee, in which the following institutions are represented:

- Bunda College of Agriculture (Chair)
- Biology Department, Chancellor College
- Biotechnology-Ecology Research and Outreach Consortium (BioEROC)
- Centre for Environmental Policy and Advocacy
- Department of Agricultural Research Services
- Department of Animal Health and Industry
- Department of Parks and Wildlife
- Environmental Affairs Department
- Fisheries Department
- Forestry Research Institute of Malawi
- Immigration Department
- Malawi Bureau of Standards
- Malawi Industrial Research and Technology Development Centre
- Malawi Plant and Genetic Resources Centre, Chitedze Research Station
- Malawi Police Service
- Malawi Revenue Authority
- Monsanto Malawi Limited
- Museums of Malawi
- National Herbarium and Botanical Gardens of Malawi

4.2.6 The National Health Sciences Research Committee

The Malawi Mission to the United Nations requested Malawi to provide its position on human cloning. The Ministry of Foreign Affairs and International Cooperation, being cognizant that it was a science and technology issue, asked the NRCM for advice and the NRCM referred the issue to the NHSRC. The position of the committee was as follows:

- Human reproductive cloning should not be allowed;
- Germ-line cloning for human enhancement should not be allowed;
- Malawi recognizes the potential benefit in therapeutic cloning. However, research and therapeutic activities should be carefully controlled. To this effect the following were recommended:
    - Human embryos should not be created for research/therapeutic purposes; and

- Donation of human eggs for commercial purposes should not be allowed, but compassionate donation of human eggs to a known recipient should be considered case by case;

- Although human cloning technology has not yet been introduced into Malawi, the Malawi Government should request the United Nations to assist it in developing capacity for monitoring human cloning activities; and
- In the absence of internationally recognized policy and legal frameworks on human cloning activities, the Malawi Government should request the United Nations to facilitate their development.

4.3 Trade

Three main crops dominate agricultural exports in Malawi, namely, tobacco, sugar and tea, which represent 59%, 11% and 10% respectively of the country's total export earnings. Other important export commodities with inherent potential for expansion include beans, cassava, chillies, coffee, cotton, cut flowers, groundnuts, paprika, pigeon peas, rice, soybeans and sunflowers. Malawi's major trading partners include the EU, Egypt, Japan, Kenya, South Africa and a few Asian countries. However, the European Union is the major destination for most of the country's exports, especially macadamia nuts, sugar, tea, textiles and tobacco.

Malawi imports butter, eggs, maize, meat, milk and wheat. Most of the maize is imported from USA and South Africa, and some from neighbouring Mozambique Tanzania and Zambia. The main international and regional barriers to market access include standards requirements such as ISO 9000, ISO 17025, and HACCP[1] requirements, packaging, sanitary and phytosanitary (SPS) regulations and environmental requirements. Malawi is in process of putting export strategies in place in an effort to address these barriers.

Members of Parliament vehemently oppose the introduction of GM crops, especially tobacco, because of its economic significance in generating export revenue and employment, and the strict position the EU has taken on GM products. On the other hand, research scientists consider cotton and cassava to be potential candidates for GM technology testing.

4.4 Bio-safety regulations and legislation

The country became a signatory to the Convention on Biological Diversity (CBDCBD), on 10 June 1992 and ratified it two years later on 2 February 1994. In the same spirit, Malawi signed the CBD's Cartagena Protocol on Biosafety in May 2000, but the Protocol is yet to be ratified.

4.5 Food security

Maize is a major food crop in Malawi. Ninety percent of rural households produce the crop, usually on less than one hectare. The crop accounts for about 80% of the land cultivated by smallholders and is a staple food for over 70% of the population. There has been a decline in average *per capita* maize production (from 204 kg in 1970 to 161 kg in 1990) and stagnation in total production (average of 1.5 million metric tonnes [MT] per annum). Production is far surpassed by the total maize requirements, estimated at 1.8 to 2.2 million MT. This has forced government to import maize or seek food aid to meet the shortfall. The cost of importing maize ranges between US$250 and US$300 per MT.

[1] Hazard Analysis Critical Control Point: the systematic identification and management of risks associated with the manufacture, distribution and use of food ingredients

The low maize production is due to a number of constraints, which include declining soil fertility, low technology adoption, pests and diseases, drought and floods. Low maize production contributes to high rates of malnutrition in the country. It is estimated that over 30% of the population is malnourished and that about 60% of the rural population are unable to meet their nutritional needs.

Reducing the cost of fertilizer and/or free distribution of inputs has been one of the country's strategies to address the problem of food shortage. For example during this year (2005), the government will subsidize fertilizer for maize and smallholder burley production by 50%. In addition, the government has intensified irrigation programmes by supplying treadle pumps to all political constituencies to enhance production of maize as a staple food. The government is also campaigning for production of drought-resistant crops such as cassava and potatoes, and is encouraging the general public to include roots and tuber crops in their diet.

The 2001/2 food shortage of approximately 250,000 MT forced Malawi to accept GM food aid in form of maize from the US Government for the first time. Although needy families consumed the GM maize, the various stakeholders were uncertain of the effects of this commodity on human and animal health, as well as on the environment. The views of the Malawian Consumer Association (CAMA) are that, even during this year's (2005) food crisis, the country should not import GM maize or accept it in the form of food aid. However, research scientists appear to be divided, some arguing that that CAMA's fears are unfounded and others observing that, in the absence of adequate information, it is difficult to take sides on the issue.

5. VIEWS OF STAKEHOLDERS

5.1 Government officials

Government officials consulted represented the four key sectors: Department of Environmental Affairs (Agriculture, Natural Resources); Health; Commerce and Private Sector Development; and Industry, Science and Technology. Most government officers are aware of GMOs but are have inadequate information on the effect of such products on humans, animals and the environment. In the absence of authoritative data and information on the risks and benefits associated with genetically modified organisms, government officials have mixed reactions to introducing this type of technology into the country; some are positive and others are negative. However, there is a general understanding that Malawi would lose a competitive edge, especially in agriculture, if it does not build capacity in genetically modified technology.

The government's position on GMOs is well summarised in a statement made by the former Deputy Secretary to the President and Cabinet, Mr M. B. Kamphambe Nkhoma, during the consultative meeting on modern biotechnology held on 17 July 2003. He said that it is a known fact that whatever developments occur in the scientific and technological fields elsewhere will affect Malawi in one way or the other, and he wondered how long the country was going to be a passive recipient of technologies, which it did not even understand very well. Further support of the introduction of biotechnology into the country can be found in 2003/04 Budget Statement by the Minister of Finance, in which he emphasized the need to refocus the country's development paradigm from a consumption-based economy to a production-based one. He further stated that science and technology are critical elements in the attainment of this economic goal, and that biotechnological developments offer such opportunities.

Perceived benefits of GMOs include improvement in food production and an increase in farmers' incomes. However, government is aware that the public is apprehensive of GMOs because of lack of information and increasing misconception.

One of the major concerns among government officers relates to trade, especially with EU countries where GMO products are heavily regulated. Although the EU has a GMO labelling tolerance limit of 0.09%, Malawi's lack of capacity to regulate and monitor this limit is puts the country in a precarious position. Other issues of concern with regard to GM technology include:

- limited human, technical and financial capacity to handle/manage GMOs;
- safety issues pertaining to GM products as regards to food, health and environment;
- viability of GM seeds;
- lack of public awareness regarding the risk of genetic modification to humans, animals and the environment;
- crosspollination between GMOs and non-GMOs;
- the need to have a realistic and implementable policy;
- funding for biotechnology research activities in the country;
- the role of a terminator gene in seed;
- potential to transfer resistance to unintended species and allergenic compounds to foods that might not have been the initial objective; and
- ethics. Should man be allowed to create living organisms?

Most officers interviewed are aware that the government is developing a Biotechnology Policy in consultation with key stakeholders, and they expect strategies identified through this process to address public- and private sector concerns on wide-ranging GMO issues.

5.2 Biosafety legislators and regulators

Members of Parliament are aware of GMOs. Most learned about them after the country received the GM maize consignment donated by the US Government during the 2001/02 food crisis in the country. While the legislators appear to appreciate the likely contribution of GMOs to food security, they are not well informed about the likely health effects of consuming GM food. They fear negative effects of traded commodities, especially tobacco. During the consultative meeting with legislators, the Hon. Dzoole Mwale discussed the role of the Parliamentary Committee on Agriculture, Natural Resources and Environmental Affairs. In his presentation, the Hon. Mwale described Malawians' perception of biotechnology, especially GMOs, depicting their fear of GMOs and the dilemma the country faces. The Hon. Mwale placed the onus on the scientific community to create public awareness of the effects of GMOs and to propose strategies by which the country could overcome the GMO dilemma.

Following the presentation by the Hon. Dzoole Mwale, the Hon. S. M. Chimphonda emphasized the impact of GM products on Malawian exports and trade. His presentation singled out the effect that GM tobacco seed will have on trade with EU member states, which are the major trading partners in the tobacco industry. He reiterated that GM seed is not welcome in Europe, so it was important for Malawi to re-examine the strategies for increasing agricultural productivity, such as fertilizer subsidies, which Malawi abandoned some years back.

The last intervention on the subject was made by the Hon. A. N. Jumbe, focussing on the status of the livestock industry in Malawi. His presentation outlined factors that have led to the drastic decline in livestock population, and raised concerns about the effect of GMO technology on livestock. His concerns were based on a perceived general lack of knowledge of the effects of raising and consuming such products. The parliamentarian outlined some

non-GMO recommendations that the government should consider to increase livestock production, which included strengthening extension services in the country.

The Minister of Environment is currently the Regulatory Authority for GMOs, according to the Biosafety Act. The regulatory function is likely to be transferred to the minister responsible for the National Research Council of Malawi after the Biotechnology Policy is in place. The change in responsibility was proposed during a series of consultative meetings which identified the NRCM as an appropriate organization to regulate a wide array of biotechnology concerns in the country.

With the Act in place, GMO testing can proceed, provided the Minister signs the permit to conduct such research. However, since there is no policy for biotechnology, there is no budgetary allocation for processing applications. As such, any applicant for GM research would have to contribute to the cost of regulatory activities, including the cost of sending samples for testing to a foreign country.

Major concerns for the Regulatory Authority hinge on capacity development and funding to establish special laboratories and purchase equipment, as well as meeting the cost of regulatory functions.

5.3 Agricultural research and development institutions

Research scientists do not appear to have a uniform stand on GMO technology. For example, Dr Theu of the Department of Research and Technical Services takes the position that Malawians have been using GM products for a long time in the form of pharmaceuticals such as insulin (However, most users are not aware of the origins of these products). Dr Theu considers the introduction of GMO research into Malawi, especially in maize, cassava and cotton, as beneficial.

In contrast to Dr Theu, a research scientist from the Biotechnology-Ecology Research and Outreach Consortium (BioEROC), Mr Changadeya, proposes a precautious introduction to genetic modification in agriculture, food and feed. His position hinges around safety, concerns about human and animal health, and the environment. Other issues influencing this stance include intellectual property rights and social concerns. Mr Changadeya argues that the country should first work out how the potential of biotechnology will contribute to the social and economic development in Malawi. The Biotechnology Policy which is under development is a move in the right direction.

The Agricultural Research and Extension Trust (ARET), represented by Dr Eric Chilembwe, considers genetic modification of crops as beneficial to the country, provided there is adequate infrastructure and funding for operations. Some of the benefits cited include speed of technology generation, and exposure to new horizons and opportunities in research. However, Dr Chilembwe highlighted investment in human and technical capacity development to monitor GM technology effectively as one of the major areas to be considered before embarking on full-scale testing of genetic modification. Other issues regarding GMOs that concern ARET include the risks related to trade, health and the environment. The organization observed that the Biotechnology Policy being developed should address most of the concerns and provide guidelines to stakeholders on how to handle specific issues.

5.4 Academic experts

Two academic experts, one a seasoned and senior professor in animal physiology and the other a practising consultant and senior lecturer in agribusiness management, were consulted. Responses from both sources converged on the problem of contaminating the gene pool, which might be irreversible in the long run. While they both did not object to

consumption of GM maize, they concurred that it should be imported into the country as flour and not grain. They observed that the potential to contaminate existing crop species is high, considering the proximity of farmers' fields to each other and the difficulty of isolating GM fields from non-GM fields in a country with acute land shortage. As such, both did not endorse establishment of research trials in the country.

In the event that the country finds itself importing potentially GM food, the academics advised that the commodities should be quarantined and screened thoroughly by the country's research station and the Malawi Bureau of Standards (MBS) before being released for consumption.

5.5 Importers and exporters

Rab Processors imports and exports food commodities and also trades in agricultural inputs such as seed and fertilizer. The company exports mainly lentils from cow peas, chick peas and pigeon peas, maize flour and chillies to Europe and South East Asia. In order to comply with European GMO requirements, the company obtains non-GM certification from Bvumbwe Research Station, one of the national agricultural research systems in the country. Certification for non-GM material is not required by other countries.

Rab Processors believes that Malawi should identify a specific zone to pilot the commercial exploitation of genetic transformation of crops without contaminating non-GM crops. Further, the company recommends investment in capacity development to effectively manage and regulate the technology. If capacity is not developed, the country is likely to import expensive technology that smallholder farmers may not be able to afford.

Rab Processors has no policy for processing and dealing with GM foods but, if an opportunity arises, especially in vegetable processing, the company would consider investing in it. It is of the opinion that the outcry on GMOs is politically motivated by major donor countries whose agenda is not known to developing countries such as Malawi.

5.6 Food aid organisations

The World Food Programme WFPdoes not take any position on genetically modified food. Since it is hosted by the government of the country where food aid is needed, it abides by the existing policy framework in the country. However, in terms of ethics, the WFP is guided by the stand of the World Health Organization and the Food and Agriculture Organization of the United Nations FAOon this subject. They have confirmed that there is no scientific evidence that GM foods currently available on the international market are unsafe to eat. These foods have passed risk assessments conducted by national authorities in donor countries and are not likely to present risks for human health (FAO, 2004).

GM foods have been consumed on literally billions of occasions. No effects on human health have been shown as a result of the consumption of such foods by the general population in the countries where they have been approved. The WFP's concern is only with GM foods currently marketed and donated to the Programme. THE WFP offer no opinion on GM foods not yet tested or under development.

The WFP distributes GM food to people because the people are hungry and these products are nutritious – corn-soya blend is especially so. Some GM products are essential in supplementary feeding activities. WFP also receives in-kind donations of foods for use in its humanitarian activities, some of which contain GMOs or have a biotech content (i.e., maize/corn and soy products). In fact there are no existing international agreements with regard to trade in food or food aid that deal specifically with food containing GMOs. It is therefore UN policy that the decision with regard to the acceptance of **Error! Reference source not found.** commodities as part of food aid transactions rests with the recipient

countries. It is WFP policy that all donated food meet the food safety standards of both the donor and recipient countries and all applicable international standards, guidelines and recommendations.

The WFP is also often asked whether it is involved in 'dumping' **Error! Reference source not found.** foods from donor countries on the hungry poor. The response is an emphatic 'No'. According to WFP, nearly all commodities are purchased on international and domestic commercial markets, either by WFP directly or by its donors. Because there is usually no differentiation between the two by the donor, most GMO crops are mixed with non-GMO crops in storage, and it is impossible to say whether WFP is being used to 'dump' these commodities. However, there are no silos or warehouses of surplus GM foods. Also, the price of both maize and soy has been rising so it is hard to see how these commodities are being 'dumped' as surpluses when they could be sold commercially.

5.7 Farmer organisations

According Mrs Betty Chinyamunyamu of the National Smallholder Farmers Association (NASFAM), GM crops would improve yields and resistance to pests and diseases. NASFAM considers other potential benefits of GM crops to include drought resistance and improvement in product quality in line with consumer expectations and demand. However, the organization's concerns with GMOs revolve around their long-term safety for humans and the environment. These concerns are caused by a lack of information and limited research on GMOs. In the absence of information, coupled with unbalanced debate on the subject, NASFAM observes that public awareness of GMOs is poor. NASFAM also observes that people's attitude towards GMOs may be influenced by who is donating them. For example, they may develop a hostile attitude towards GMOs when interacting with the EU or a positive attitude when interacting with the United States Agency for International Development (**Error! Reference source not found.**). NASFAM is not aware of any strategies that are being developed to address the concerns raised concerned parties about GMOs.

In contrast to NASFAM, the Farmers Union of Malawi (FMU), which is supposed to be an umbrella organization for all farmers associations in Malawi, has not taken any official position about genetic transformation of crops. This is due to the varying opinions of its members, currently 15 water users and commodity associations who are involved with grain legumes, citrus fruit (Zipatso Association), sugarcane and smallscale seed multiplication. One other reason why FMU does not have a stand on this issue is that genetic modification of crops is not a priority area for smallholder farmers, who have yet to realise the potential of existing technologies. The Union is also cautious of the cost implications of GM technology and advocates technologies that are neither inferior nor too advanced for the average farmer, for example, government-promoted open-pollinated varieties (OPVs).

Although FMU has not taken a stand on GM technology, it is a member of an international civil society network called Participatory, Ecological, Land Use Management (PELUM), which is totally against introduction of GMOs. The recently launched network has a membership of over 160 civil society organizations from Botswana, Kenya, Lesotho, Malawi, Rwanda, South Africa, Tanzania, Uganda, Zambia and Zimbabwe. According to their communiqué, PELUM is calling upon all governments in East, Central and Southern Africa to put in place a moratorium on GMOs until they are proven safe for consumers and conducive for the use of smallholder farmers.

The FMU appreciates that one of the reasons for misconceptions about GM, especially among smallholder farmers in Malawi, is their high level of illiteracy and the lack of information about the risks and benefits of the technology. The problem of public awareness is being addressed through regional information-sharing initiatives being implemented by the Southern Africa Confederation of Agricultural Unions (SACUA). The International Policy

Research Institute (IFPRI) is also mounting a capacity building exercise intended to strengthen the participation of farmer associations in research and technology development.

5.8 Input suppliers

Two representatives in the input subsector were interviewed on their opinion of genetic transformation of crops. These were Farmers World, a fertiliser and seed distributor, and Chemicals and Marketing, a distributor of agrochemicals. Farmers World considers introduction of GM technology in Malawi unnecessary, since low farmers have not even reached half the productivity level that can be reached with conventional technologies , i.e., hybrid seed and inorganic fertiliser. The argument that genetic transformation would confer disease- and insect pest resistance and that farmers would reduce cost of production was challenged on the basis that Malawian farmers do not apply any agrochemicals due to capital constraints. Another observation made by Farmers World is that GM technology would lead to contamination of the gene pool due to crosspollination between GMO and non-GMO fields. Whereas in South Africa, fields growing GMO crops are isolated from those growing conventional crops, making it possible to control contamination due to crosspollination, the Malawian cropping system, coupled with shortage of land, makes it difficult for Malawians to implement GM technology. Farmers World further observed that genetic transformation (resistance development) that would occur naturally in diseases and insects would reduce the efficacy of GM crops in terms of resistance to the former. The failure of GM cotton in India to sustain its genetic potential over time was cited by Farmers World as a lesson that Malawi should learn.

Chemicals and Marketing has taken an optimistic but cautious position on genetic transformation of crops. According to Mr Patrick Khembo, the Managing Director of the company, any major decisions on GM technology should be taken after thorough research and consultations with stakeholders because this is a complex issue, which should be handled with care.

5.9 Consumer organisations

The Consumer Association of Malawi (CAMA), represented by Mr John Kapito, is totally against introduction of GMOs into Malawi. One reason of their reasons is that GM pollen could blow onto the fields of non-GM crops, leading to contamination. CAMA further rationalises its position with the argument that some consumers are concerned about food safety and the toxins and nutritional changes, allergies, antibiotic resistance, and environmental changes that GMOs might bring. In addition, transfer of genes from one species to another may have ethical implications. For example, the Moslem community would oppose transfer of genes from pigs to goats even if this might have desirable attributes. The Consumer Association observes that there has been inadequate assessment of the negative effects of GMOs, and that the country does not have adequate capacity to monitor GMOs.

5.10 'Pro biotechnology' groups

Monsanto, which supplies hybrid seed and agrochemicals, is a pioneer and a major advocate of GM technology. According to Monsanto, GM technology has tremendous potential to increase crop production and farmer incomes, and reservations expressed by anti biotechnology groups are illconceived and uninformed. The major concern of this organisation is bureaucratic red tape in processing and approving applications to conduct GM trials in the country.

5.11 'Anti biotechnology' groups

The first civil society position paper was submitted to government in November 2002 by the interim civil society steering committee on GMOs, chaired by the Malawi Economic Justice Network (MEJN). The bottom line in that position paper was that Malawi should not accept GM maize and should be cautious when dealing with genetic engineering issues.

5.11.1 The Malawi Biosafety Act

In their analysis, MEJN concluded that the government had hurriedly drafted the legislation re genetic engineering (the Biosafety Bill), based on the South African legislation, in response to the food crisis and GM food aid. They thus implied that the consultation process was inadequate which was why it was agreed by different parties in 2003 that the Biosafety Act was in actual fact a GM Act, as it failed to consider important aspects such as intellectual property rights.

The Biosafety Act conflicts with the Science and Technology Act in that both deal with biotechnology. A further complication is that the two Acts are administered by different Government Departments:

- **The Biosafety Act** is administered by the Environmental Affairs Department;
- **The Science and Technology Act** will be administered by a National Commission on Science and Technology (yet to be established but provided for under the Science and Technology Act).

The position of the Civil Society Agriculture Network (CISANET) is that the Biosafety Act needs to be reviewed and an amended Act approved by parliament after adequate civic education of the parliamentarians. The review process needs to be led by a popularly selected stakeholder steering committee, comprised of civil society, government support agencies and private sector. (The interim civil society steering committee was quickly and loosely instituted and operates on an *ad hoc* and reactive basis). The amended act should be benchmarked on a reasonable sample of similar acts. Acts from both GMO-supporting and non-GMO-supporting countries should be reviewed and considered. In addition, there is a need to harmonise the Biosafety Act with the Science and Technology Act. These amendments need to undergo a series of stakeholder peer reviews until all key concerns and observations have been taken into account.

5.11.2 Coordination among various stakeholders in the agriculture sector

Plant-based GMO issues are likely to continue dominating the GMO debate in Malawi in the foreseeable future due to the predominance of crop agriculture. However, a rich debate in this area has been constrained by a fragmented seed industry and outdated seed polices and legislation. The Malawi seed industry has been fragmented for a long time, with many missing links between government, seed producers, seed multipliers, seed market and farmers that would otherwise promote sustainable seed security in terms of seed availability, access and utilization (i.e., acceptable quality attributes: genetic, physiological, physical and phytosanitary). The advent of market liberalization simply aggravated the situation. The recent review of the seed legislation presented in November 2004 by the IFDC (International Fertiliser Development Corporation) recommended the review of the current seed legislation to provide for: the production/availability of good quality seed; registration of seed sellers; inspection of seed products and records; analysis of seed samples; financing of the seed regulatory system; administration, enforcement and penalties; and publication of findings.

This requires that government should designate a Controller of Seeds to administer the seed legislation and its regulations and seed certification. There is also need to have a National Seed Controlling Laboratory accredited by ISTA (the International Seed Testing Association) at Chitedze Research Station, as well as a seed services fund and a national seed

organisation. However, all existing seed-testing laboratories need urgent renovation, refurbishment, staffing and sufficient funding.

The CISANET position on the GMO issue is that the civil society steering committee on Biotechnology/GMOs needs to actively and consistently collaborate and effectively coordinate with the Seed Trade Association of Malawi (STAM), established in September 2004, which is affiliated to the Africa Seed Trade Association. STAM's board members are Monsanto, SeedCo, Pioneer/Chemicals and Marketing, Panar, and ASSMAG. Other members include various seed traders and vendors. The views of other food and nutrition organisations and civil society need to be balanced with those of STAM, as the latter are to impartial about biotechnology (e.g., Monsanto is the leading developer and marketer of GMOs).

Furthermore, CISANET needs to champion advocacy work on developing and strengthening the national capacity for seed analytical service delivery because Malawi's lack of capacity to handle GMO seed analysis issues hinders timely, informed decision-making. In addition, CISANET and other food and nutrition organisations should not let the GMO issues cloud and hinder the scaling up of other sustainable seed approaches ,such as multiplying and distributing indigenous seeds, seeds banks at community and household level, crop diversification, improved environmental practices around farming, etc.

5.11.3 Consensus building

Rich debate and national consensus building on the GMO issue is constrained by the fact that the majority of people, including civil society, lack knowledge of genetic engineering technology, its products and the GM industry. This weakens civil society leverage in advocacy work. In general, one needs relevant scientific grounding in genetic engineering in order to comprehend the issues at hand (a university diploma or degree is not a visa to understanding genetic engineering/GMO issues, unless it is in the relevant field!!). In addition, there are related international trade issues, such as the trade-related intellectual property rights to patents, trademarks, copyrights, trade secrets, etc.

The position of CISANET is that advocacy strategy with regard to GMOs should incorporate a wide civic education campaign (and production of IEC materials) on genetic biotechnology/GMOs in simple language to standardise the understanding of the issues and stimulate participation in the debates on the way forward. Civic education campaign materials should be developed and reviewed by a balanced team comprised of those for the technology, those who don't care either way, and those against it.

5.11.4 Perceived risks from GMO

There is an international outcry that GMOs present risks to the environment and possibly to human health. Because of this, Malawi is advised to be cautious about accepting GMO food aid, such as is offered during food crises by support agencies. Some of the risks shared around the world are:

- **Inadequate scientific knowledge** about GMO risks;
- **Unintended effects**: The process of genetic engineering involves random location of genes when making GMOs. It is feared that this can generate unintended effects and that there is no control over genes equivalent to that in the natural breeding process. For example, literature on GMOs mentions that GM cotton has deformed balls and GM soya has increased lignin;
- **Allergic reactions**: Contamination of US food products with GM Starlink maize in 2000 was believed to have caused allergic reactions in some 50 Americans. Allergies in the states have risen over the past decade at staggering rates;

- **Increased chemicals**: Herbicide-resistant GMO plants imply increased herbicide toxicity in the environment (e.g., water pollution), and that herbicides would find their way to human and animal bodies and accumulate there due to non-biodegradability;
- **Surrounding areas** can be contaminated by GM plants (through open pollination) hence they are a threat to biodiversity, ecological balance and non-GM food:
    - The literature on GMOs cites transgene contamination in centres of origin and diversity, such as maize in Mexico;
    - At local level, there is fear of destroying community-based technologies, e.g. , seed recycling, especially of OPVs;
    - Considering that smallholder farmers in developing countries prefer to save, exchange and use seeds from their last harvest in the next growing season, patenting of GM seeds violates farmers' rights. Monsanto sued a farmer in Canada for this issue. The farmer had not planted Monsanto seed, but Monsanto seed from a nearby field contaminated the farmer's seed;
- **Donor dumping** of GM commodities on local markets of developing countries through tied aid and/or aid in kind hinders development of local markets and private sector, and also limits choice and flexibility in development planning:
    - Especially considering that emergence of GM agriculture is led by the agrochemical industry, not poor farmers;

In view of the wide range of potential risks from GMOs, only some of which are listed above based on standard literature about GMOs, CISANET is of the view that:

- GMOs must be looked at critically and cautiously;
- National capacity should be developed to assess the impact of GMOs on human health and the environment, and to cope with the known and potential risks associated with GMOs and their products;
- In times of food crises, there must be early national action on food procurement planning and negotiation with support agencies for 'quality aid', including aid that is in cash and not in kind, and not tied to such conditionalities as 'countries of origin procurement rules and regulations' so that Malawi can have room to choose the most appropriate and cost-effective sources of non-GMO food to solve an impending food crisis. This will have the added advantage of minimizing costs associated with managing GMOs; and
- Malawi should continue to amass unfolding proven scientific knowledge on biotechnology and its adverse effects on human health, biodiversity and the environment in general.

5.11.5 Avoidance of international legislation and regulation of GMOs by donors

Despite being the major developer and distributor of GMOs, the US has eschewed international legislation. There are two international instruments governing biotechnology in general and GMOs in particular:

- The Convention on Biological Diversity; and,
- The Cartagena Protocol on Biosafety.

The US as a major GMO producer/exporter is not a party to either of these. The Cartagena Protocol is the most relevant instrument at international level dealing with GMOs. It deals with international trade and transboundary movement of living modified organisms. Again, all the major exporters of GMOs, such as Argentina, Canada and the USA, are not parties. In

addition, the Protocol only deals with LMOs, so that GMOs that are not alive are not regulated, even though they can have adverse effects on human health. The Protocol incorporates the precautionary principle: *Parties should not refrain from taking measures to prevent adverse effects on human health and the environment merely due to lack of scientific certainty or lack of information*. This may be a cause of concern for non-parties, who might consider a decision reached using the principle as a non-tariff barrier to trade and therefore a violation of **Error! Reference source not found.** rules.

Although the Protocol does not apply to countries that are not party to it, nevertheless parties are required to adhere to the Protocol in their dealings with non-parties. This may be a challenge in times of food crisis when options are limited. The position of CISANET is that, in the promotion of biotechnology/GMOs, the US and other major developers and distributors of GMOs should be exemplary in adhering to the international protocols regulating this issue.

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APPENDICES

APPENDIX 1
1. Terms of Reference

The questions and issues that need to be addressed are divided into three sections:

Trade

Out of this section, we would like to establish what the main produced and traded agricultural products in each specific country are, and what the impact on trade would be if farmers are permitted to plant GM crops.

1. What are the main agricultural commodities produced by the country?
2. What are the main agricultural export commodities of the country?
3. To which countries are these commodities exported?
4. Which agricultural commodities are being exported to international markets like the EU, US and Asia?
5. Trade data with crop volumes, values and destinations.
6. What market access barriers does the country face regionally and internationally?
7. How is the country coping with the challenges?
8. What are the main agricultural import commodities for the country?
9. Which commodities does the country import to address food security?
10. From which countries are these commodities imported?
11. What are the [case-study crop 1] trade policies and regulations in the country?
12. What are the [case-study crop 2] trade policies and regulations in the country?
13. What are the [case-study crop 3] trade policies and regulations in the country?

Bio-safety regulation and legislation

Out of the questions in this section we would not only like to find out what regulatory systems and legislation manage biotechnology and GM crops in each country, we would also like to know some history of the involved parties and how the systems and regulatory bodies were established.

1. Which international agreements on trade and biotechnology has the country acceded to?
2. What institutional frameworks and policy arrangements have the country put into place to deal with issues of biotechnology and biosafety?
3. How did these frameworks and arrangements develop? (Who, what when?)
4. What has the country done to comply with the provisions of the Cartagena biosafety protocol?
5. What are the national bodies/institutions charged with the decision-making mandate on issues of biotechnology and biosafety?
6. Had the country developed a national biotechnology policy?
7. Do you have a biosafety law?
8. Has the country formulated biosafety guidelines and regulations?
9. Has the country established a national biosafety committee?
10. Do the country have capacity to screen GM foods at ports of entry?
11. Do you have, and if so, what are the standards for GM food and feeds?
12. What different property rights acts are being imposed in the country? (plant breeders rights, trade mark rights, other intellectual property rights)
13. Do the courts and rest of the judiciary system enforce compliance with property rights?

14. What is the status of GM crops research and development in the country? (Public, academic and private)
15. What crops have been identified for possible biotech related R&D?
16. What GM crops have been approved for trails or testing in the country?
17. Are there plans to introduce GM crops for testing in the near future?
18. Are there plans to commercialise any GM crops in the near future?

Food security

In this section the main concerns are how the different countries manage food aid and what their position is regarding food aid that might be or is genetically modified.

1. Is this country a regular food aid receiver?
2. Food aid data (crops, volumes and country of origin)
3. Which commodities where received as food aid?
4. From which countries were these commodities imported?
5. Has the country imported food aid with GM content?
6. What is the country's position and policy regarding food aid and feeds with GM content?
7. What are the major concerns associated with GM crops in the country?
8. How are these concerns being addressed?
9. What strategies/interventions has the country put in place to cope with food security?
10. Do the country's national policies recognise the potential of biotechnology in increasing food security and alleviating poverty?
11. Is the country exploring or exploiting biotechnology related interventions to address food insecurity?

Information, insights and opinions of the different stakeholders and information and data from applicable literature will be presented in three formats.

1. A comprehensive report summarising the findings with different sections on trade, biosafety and food security
2. Electronic copies of available trade data and food aid data
3. A template for each interviewed stakeholder with:

3.1 Name of organisation
3.2 Type of organisation (according to groups on page 1, e.g. farmer org., academic or department of labour)
3.3 Name of contact person and contact details
3.4 A brief summary of organisation's scope and mandate
3.5 A summary of challenges facing the organisation in the areas of trade, food security and GMOs
3.6 Nature of interest expressed in the project.

APPENDIX 2
2. Respondents to and Participants in Consultative Workshops

3. INCEPTION WORKSHOP FOR THE NATIONAL BIOTECHNOLOGY POLICY, 26TH MAY 2005, LILONGWE HOTEL

4. Registration Form

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APPENDIX 3

5. Participants in the Workshop on Modern Biotechnology Policy, Workshop Report, Malawi Institute of Management, Jointly organised by National Research Council of Malawi and Centre for Environmental Policy and Advocacy, 17th July 2003

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6.

7. APPENDIX 4

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