Edited by Peter Draper
and Nkululeko Khumalo

TRADE IN GENETICALLY MODIFIED FOODS

Decoding Southern African Regulatory Approaches

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Acronyms and Abbreviations

AB	Appellate Body
ABSF	African Biotechnology Stakeholders Forum
AIA	Advanced Informed Agreement
AU	African Union
BCH	biosafety clearing house
Bt	*bacillus thuringiensis*
CBD	Convention on Biological Diversity
C-CAM	Conformal Cubic Atmospheric Model
CED	Centre for Environment and Development
CIEL	Centre for International Environmental Law
CIR	commercial import requirement
CIS	Commonwealth of Independent States
COP	Conference of the Parties
COP-MOP	COP serving as the Meeting of the Parties
CSIRO	Commonwealth Scientific & Industrial Research Organisation
CSSD	Consultative Subcommittee on Surplus Disposal
DMA	Disaster Management Authority
DMMU	Disaster Management and Mitigation Unit
DRC	Democratic Republic of the Congo
EBIC	Egyptian Biotechnology Information Centre
EC	European Commission
EFSA	European Food Safety Authority
EU	European Union
FAC	Food Aid Convention
FAO	Food and Agriculture Organisation
FDA	Food and Drug Agency
FDI	foreign direct investment
FFDCA	Federal Foods, Drugs and Cosmetic Act
FFPs	food, feed and processing
FRA	Food Reserve Agency
GATT	General Agreement on Tariffs and Trade
GCMs	global climate models
GDP	gross domestic product
GFAC	Global Food Aid Compact
GIC	Global Industry Coalition
GM	genetically modified
GMO	genetically modified organism
HT	herbicide-tolerant
ICJ	International Court of Justice
IFAD	International Fund for Agricultural Development
IGTC	International Grain Trade Coalition
IPCC	Inter-Governmental Panel for Climate Change

IPPC	International Plant Protection Convention
IPR	intellectual property rights
ISAAA	International Service for the Acquisition of Agri-biotech Applications
ISB	Information Systems for Biotechnology
ITCZ	inter-tropical convergence zone
KARI	Kenyan Agricultural Research Institute
LDC	Less-developed Country
LFIDCs	low-income food deficit countries
LMOs	living modified organisms
MAS	marker assisted selection
NEPAD	New Partnership for Africa's Development
NFIDCs	Net Food-Importing Developing Countries
OECD	Organisation for Economic Co-operation and Development
OIE	International Office of Epizootics
PCG	PVA, cellulose and glass
PVP	plant variety protection
SADC	Southern African Development Community
SAIIA	South African Institute of International Affairs
SPS Agreement	Agreement on the Application of Sanitary and Phytosanitary Measures
SRES	Special Report on Emission Scenarios
TAR	Third Assessment Report
TBT	Technical Barriers to Trade
tralac	Trade Law Centre of Southern Africa
TRIPS	Trade Related Intellectual Property Rights
UIDs	unique identifiers
UMRs	Usual Marketing Requirements
UNCTAD	United Nations Conference on Trade and Development
UNEP-GEF	UN Environmental Programme Global Environmental Facility
UPOV	Union for the Protection of New Plant Varieties of Plants
USAID	US Agency for International Development
USDA	US Department of Agriculture
WFP	World Food Programme
WHO	World Health Organisation
WRI	World Resources Institute
WTO	World Trade Organisation

Preface

Agriculture is the life-blood of Africa: more than half of Africa's labour is involved in food production, and agriculture forms a significant portion of the continental GDP. Despite this, productivity levels per hectare in Africa are less than half those of the global average, and up to 40% of African yields are lost to post-harvest damage. The 'Green Revolution', spearheaded by people like M.S. Swaminathan and Nobel laureate Norman Borlaug in the 1950's and 60's – which allowed food production to increase apace with the global population increase – has largely passed Africa by. Africa imports approximately 25% of its grain needs each year. Adequate nutrition thus remains a significant problem across Africa, prompting the UN Millennium Project goal of halving the number of people who suffer from hunger.

Biotechnology – the use of living organisms or biological systems in the production of useful goods and services – offers a powerful tool in this fight against hunger and malnutrition. Already (in 2006) in excess of 100 million hectares globally was being used for growing biotechnology crops, and 90% of all farmers using biotech crops were resource-poor farmers from developing countries. Unfortunately, Africa has not yet seized the opportunity and potential that biotechnology can offer.

South Africa is different. We promulgated our Genetically Modified Organisms Act in 1997 – the Biosafety framework managing the responsible introduction of GM organisms into the environment – and in 2001 we published our National Biotechnology Strategy. Through the Department of Science & Technology, six institutions have been created to give effect to biotechnology innovation in South Africa, and together they offer financial and business support to innovative projects, and the appropriate infrastructure to enable success. In excess of 1.4 million hectares has been devoted to biotechnology crops (maize, cotton & soybean) in 2006, and there is a growing trend. Our farm income gain from biotechnology is estimated at US$76 million (for the period 1998 to 2005).

We recognize, nevertheless, that food security problems are complex and not limited merely by the technical, infrastructural, social & political issues of agricultural production efficiency. There is, for example, the persistent threat that trade barriers to genetically modified (GM) goods will prevent some nations adopting the technology, thus preventing them from deriving a commercial benefit. Consumer perceptions of the safety of GM crops can also dramatically

impact on the uptake of technology. So, in striving to attain the goal of food security, our efforts must necessarily be broader than 'merely' agriculture technology.

SAIIA is to be commended for taking on this complex topic, and providing such a useful and insightful analysis of issues affecting the development of biotechnology crops in Southern Africa. This book has not only a broad scope – ranging from climate change to public opinion issues – that affects food security in Southern Africa, but it also gives an in-depth analysis to promote understanding and to provoke thinking on the development of agricultural biotechnology. As such, this book should prove invaluable to policy makers, regulators, the industry and other stakeholders.

Again, we recognize that this is a fast changing field – the African Model Law on Biosafety, for example, is up for revision and several African nations are on the verge of commercializing GM crops. Ultimately, what South Africa – and indeed Africa and the world – wants, is a set of tools, policies and the enabling environment that will help promote responsible and sustainable agriculture. Particularly in Africa, this sustainable agriculture must seek to address the needs of the hungry, must allow us to develop livelihoods for the under-employed, and must lead to growing, competitive and sustainable industries.

About the editors

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Introduction

Food security and self-sufficiency have consistently eluded Southern African Development Community (SADC) countries over the last decade. To date, millions of people still suffer from chronic starvation and malnutrition, and rely heavily on donor food aid on a yearly basis in order to survive. This situation is clearly untenable, and effective and sustainable solutions must be found sooner rather than later.

Indeed, it has been convincingly argued that part of the solution to the food security problem in this region lies in the proper adoption of modern farming techniques, particularly agricultural biotechnology, and the creation of a friendly trade and regulatory environment for genetically modified (GM) food products. For instance, with regard to the former, African countries have so far generally failed to take advantage of technological advances in industry and agriculture. The result is poor yields, especially at a time when drought-inducing climatic changes are making it difficult for farmers to produce much using conventional methods of farming.

Genetic modification can, for example, be used to promote a desirable crop characteristic or to suppress an undesirable one. The positive effects of this technology on agriculture include higher yields, reduced pesticide use and enhanced product attributes. Yet concerns over its largely unknown and often exaggerated potential risks to human health and the environment have led to strong opposition to GM technology. In the process, objective, science-based and pragmatic approaches to regulation have been neglected in favour of fear-inspired reactionary measures.

The central theme of this book is the assertion that despite potential risks (which should be prudently managed), agricultural biotechnology can be effectively harnessed to ensure food security and general economic prosperity in Southern Africa.

Rautenbach's chapter exposes the gravity of the challenges to agricultural production posed by adverse climate changes in Africa and Southern Africa. The chapter notes that agricultural activities in most of the continent are subsistence in nature and are highly dependent on air temperature and rainfall. Further, the analysis of observed trends and future projections of rainfall in this region generally indicates anomaly patterns in annual totals. The situation is exacerbated by widespread poverty in most of these countries and low access to high-technology farming, which compromises their ability to adapt to rapid

changes in climate. Therefore, climate change, which often results in prolonged droughts and severe floods, is one the biggest challenges to food security in the region. In this context, GM technology offers great potential to mitigate current and potential food insecurity challenges.

Webster, Keetch and Guthrie's chapter introduces agricultural biotechnology and provides an overview of its current status across the globe, tracing the evolution of this technology and highlighting its major benefits and potential risks. The chapter shows how the products of agricultural biotechnology have significantly benefited both the developed and the developing world, including South Africa, which is the only African country that has so far commercialised the production of GM crops. The authors argue that though the risk assessments of a genetically modified organism (GMO) for planting or consumption vary from country to country, they are very comprehensive, so as to assure a very high level of safety to the environment and animal and human health. The authors therefore strongly warn against over-regulation of new technologies due to perceived rather than real risks, as it can impede new and novel product development and introduction – which may play an important role in economic growth and development in Africa. Indeed, unnecessarily stringent regulations may also become trade barriers that impact negatively on SADC countries' ability to benefit from trade in GM products and to achieve food security.

Halleson examines the potential socio-economic implications of the positions Africa takes on biotechnology trade issues both at regional and international levels, and how they could impact on general biotechnology uptake on this continent. Accordingly, this chapter underlines the concerns arising from real or perceived adverse effects of agricultural biotechnology uptake on Africa's food sovereignty and food security. Such socio-economic concerns in Africa and elsewhere in the developing world include the fear that biotechnology uptake may result in the loss of traditional agricultural practices of immense cultural value to certain communities. Halleson observes that the African Biosafety Model Law (which is supposed to serve as a guideline for countries when drafting their national legislations) puts much emphasis on biosafety concerns. This is to be expected in a region endowed with huge genetic resources. However, such well-meaning legislation can adversely affect efforts to increase food production and trade by harnessing biotechnology if improperly applied. As such, the author calls upon African countries that wish to adopt the Model Law provisions to endeavour to reconcile valid environmental concerns with their international trade interests and obligations.

Feris assesses the potential impacts of the World Trade Organisation (WTO)

Dispute Settlement Panel's recent judgement in the case between the US and the European Community, known as the EC Biotech case, on the GMO regulatory approaches adopted by SADC countries. In this case, the Panel was requested to consider the consistency with WTO rules of various measures taken by the EU and EU member states. The claimants – the US, Canada and Argentina – had specifically requested the Panel to consider an alleged moratorium on approvals of biotech products, various product-specific EU measures related to the approval of biotech products, and various EU member states' measures related to the import and/or marketing of specific biotech products.

The chapter explores the US's and the EU's regulatory frameworks on biotechnology and finds the EU regulatory system to be a much more rigorous and time-consuming process than that of the US. Though the WTO regulatory framework that applies to GMOs is extensive, many of the substantive issues were not addressed in the EC Biotech case. More importantly, the Panel did not address the fundamental issue of whether biotech products in general are safe or not; nor did it deal with the question of whether the biotech products at issue in the dispute are 'like' their conventional counterparts. As such, the status of GMOs under international trade rules remains unclear. The Panel did, however, find the EU to be in violation of the procedural requirement not to cause 'undue delay' in carrying out risk assessments.

This uncertainty is particularly unhealthy for poor countries, which may continue to be used as pawns to advance the ends of powerful countries. It is noted that the regulation of genetic modification processes in SADC is generally informed by the need to ensure safety of GM crops for both human health and the environment, and to protect these countries' trading relations with key export markets in the EU. Unsurprisingly, SADC countries' regulatory positions seem to lean more towards the stringent EU regulatory measures. For instance, the fear of losing access to the EU due to the 'risk of contamination' led some SADC countries to either completely refuse US food aid in 2002 or accept it on condition that it is milled to prevent planting. As such, the absence of home-grown harmonised regional biotech regulatory regimes causes SADC states to be vulnerable to adopting positions that may not be in their present or long-term strategic interest simply out of pressure to align them to those of important external trading partners.

This raises the need for SADC countries to strengthen their own scientific and technological capacities and to be able to carry out objective assessments that minimise potential risks and maximise benefits. In this regard, there is need

for policy stances in these countries to be informed by domestic realities and dynamics more than external influences.

Naphambo's chapter looks at the potential trade implications of the GMO regulatory measures being pursued under the Cartagena Protocol on Biosafety, which came into force in 2003. The Protocol is a legally binding international instrument whose objective is to protect biological diversity from the potential risks posed by the trans-boundary movement of living modified organisms (LMOs), generally known as GMOs. It also applies to the use of or trade in GM-derived products such as grain. It seeks to achieve this by, among other things, establishing requirements for the handling, packaging, transportation and identification of LMOs, as well as by providing for the establishment of a liability and redress regime for damage caused by LMOs. The Protocol negotiations on packaging, handling, transportation and documentation are very important, especially because if the requirements chosen are too strict, they could hinder trade in LMOs, as they could be used as non-tariff barriers to trade in LMOs. A number of issues still remain unresolved, and negotiations are continuing.

The author highlights the disturbing fact that African countries support stringent requirements for regulating and labelling GMOs despite their capacity constraints to effectively carry out the requisite testing. Furthermore, most of the positions they have taken with regards to GMOs contrast with their stances in WTO negotiations. For example, they have been in the forefront of rejecting the inclusion of environmental protection measures in the WTO, as they feel these could be used as barriers to trade, yet in the Cartagena Protocol negotiations they support strong environmental positions that could stifle trade in GM products.

It is suggested that the level of regulatory overkill being pushed by most poor developing countries and the EU under the Cartagena Protocol is inimical to Africa's prospects as an exporter and importer of GM products, and may be found to be in conflict with WTO provisions. Considering the pressing humanitarian needs mentioned above, Africa cannot afford to be embroiled in politicised debates over genetic modification technology. Indeed, their positions in international negotiation forums like the Cartagena Protocol should be informed by such domestic imperatives and aspirations to achieve food security and self-sufficiency in future. The chapter urges African countries to support a regime that ensures that in cases where a country has a food deficit, it can easily and efficiently import food (GM or non-GM) from countries in surplus and vice versa. This is unfortunately not the case at present.

Another important aspect in the overall quest for food security in Africa is food

aid (GM and non-GM). Measures to govern food aid in the context of international trade have been mooted in the WTO and are being considered as part of the Doha Round of negotiations under the export competition pillar, together with export subsidies, export credits and state trading enterprises.

Grant looks at the possible effects of any new WTO disciplines on food aid for Southern Africa's food security situation. She underscores the fact that while the region faces enormous challenges relating to food security, it is unique in that it includes both a donor (South Africa) and some recipients of food aid. South Africa is capable of meeting the food needs in both the domestic and regional markets, while most other countries are net food-importing countries that may remain dependent on food aid for the foreseeable future. The chapter also discusses agricultural biotechnology or GM food in the context of food aid and calls for regional harmonisation in dealing with GM food that forms part of food aid.

Internationally, the African and Less-developed Country (LDC) Groups have apparently taken a very progressive position in the WTO debate on food aid. This stance is informed by the realisation that food-insecure countries need food aid, and that any new disciplines should not hinder the delivery of assistance to needy countries. These groups do, however, stress that such assistance should not result in commercial displacement in recipient countries, especially with regard to non-emergency food aid.

Moreover, the author notes that in the long term it is highly likely that food aid will be needed to address specific pockets of chronic food insecurity in a number of countries and to respond to emergency situations should they arise as a result of drought, floods or conflict in this region. The chapter concludes that much of food aid received in the region is unlikely to be negatively affected by new WTO disciplines, as it is largely needs-driven, well-targeted and provided in full grant form (very little is monetised or re-exported). Furthermore, according to case studies conducted in Lesotho and Zambia, donors do not appear to be using food aid to pursue market development objectives in SADC. Regional countries are therefore urged to participate more actively in the WTO debate on food aid, as well as in other important multilateral bodies dealing with this issue.

Khumalo's chapter provides the results of a survey to determine perceptions of and attitudes towards biotechnology, particularly GM foods, in South Africa, conducted in October 2005 by AfricaBio and the South African Institute of International Affairs (SAIIA), with the support of South Africa's National Department of Science and Technology. Among other findings, the survey shows that most people that are engaged in production of, trade in and research on GM products want biotechnology regulations to be streamlined, at least within

the SADC region. This is because the different regulations in each country make import and export difficult, and therefore a common policy should be worked out that can accommodate both pro- and anti-GM countries. The results also stress the need for research on genetic modification to be carried out in a strictly scientific and safe manner to allow it to be used as a basis for decision making. Further, the results show that most stakeholders see GM technology as potentially very beneficial and that, with the correct regulations and biosafety frameworks, it can contribute in a large way to food security in Africa.

As such, SADC countries are encouraged to emulate the regulatory approaches pursued by developing country leading lights like China, Argentina, Brazil, India and their regional leader, South Africa. These countries have realised the importance of being part of the biotechnology revolution and have invested in research and development, have commercialised GM crop production and set up regulations that seek to promote the technology while minimising potential risks to the environment.

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Chapter 1

Climate Change and Food Security in Southern Africa

C. J. de W Rautenbach[1]

INTRODUCTION

Agriculture is regarded as the most important sector in the economies of most African countries and is an important contributor to food security throughout the continent. Approximately 70% of Africa's population depend on this sector for their livelihood. It is important to note that agricultural activities in most of Africa are subsistence in nature, with a high dependence on air temperature and rainfall. The continent is therefore susceptible to significant changes in the climate system, because it has some of the world's poorest nations with little access to high-technology farming, which would hamper their ability to adapt to a rapidly changing climate. Climate change associated with prolonged droughts and severe floods are certainly the most serious hazards that face the agricultural sector of the continent. The staple food of the region, maize, is particularly susceptible to such change.[2]

Since agriculture in Africa is primarily rain fed, prolonged droughts might have a devastating effect on food security, with conditions that will affect the majority of the continent's population. Damage caused during dry seasons might discourage farmers living in regions with little financial resources in such a way that they even under-perform during wet seasons, which has the risk of leaving some African countries in a cycle of underproduction, starvation and even more poverty. The other extreme is the risk that floods hold for the population of Africa, especially in low-lying areas. In drier regions, occasional flooding might lead to erosion and the loss of fertilised soil. It might also destroy natural or human-made infrastructure, which is sometimes difficult to replace when resources are not available in poor countries.

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1 C.J. DE W RAUTENBACH is Professor and Head of Department in the Department of Geography, Geoinformatics and Meteorology, Faculty of Natural and Agricultural Sciences, University of Pretoria.

2 Parry M.L., C. Rosenzwieg, A. Iglesias, M. Livermore & G. Fisher, 'Effects of climate change on global food production under SRES emissions and socio-economic scenarios', *Global Environmental Change*, 14, 2004, pp. 53–67.

It is therefore important that African countries invest in sustainable water-development and -management strategies in order to ensure sustainable growth and poverty reduction.[3] In the drier sub-tropical Africa, river regulation and water storage can be of great benefit to agriculture and food security. Short wet seasons of torrential rain are often followed by longer drier seasons that require the storage of water. Wet seasons in many sub-tropical regions provide enough water so that, if managed correctly and stored, it may be used for irrigation during drier seasons to alleviate crop loss. Water storage and regulation systems might also reduce the damage caused by floods. However, Africa also has arid regions with absolute water scarcity, where it is difficult to implement sustainable local water-development and -management policies. In such regions, agriculture has no choice but to adapt to dry climate conditions.

On a more positive note, Africa has the advantage that the continent has both wet tropical regions and dry sub-tropical or arid regions. The wetter regions have great water storage capacity in the form of natural lakes, for example Lake Victoria, as well as extensive river networks. Cross-boundary water policies might have the potential to allow for water supply from wetter to drier regions, although it might also hold the potential for conflict. A good example of natural water supply from a wet to a dry region is the Nile river system, which transports water from the wet tropics of Central Africa to the drier sub-tropics of North Africa. In Southern Africa, rivers like the Zambezi and Gariep might serve the same purpose. In addition, human-made water supply infrastructure might be added to these systems, and if well managed, may have great benefit to cross-boundary water supply, agriculture and food security in Africa. Sustainable water-development and -management programmes and cross-boundary water supply, however, will only be successful if good governance and intra-continental relationships are in place.

Much has been said over the past decade about the risk that climate change as a result of greenhouse warming holds for the world's population, and in particular for poorer developing countries. Early detection of any current or projected changes that might occur in Africa's climate therefore is essential for early planning and the introduction of adaptation strategies to ensure sustainable food security. It is important that scientists use all the measures available to monitor Africa's climate and to generate possible future climate change scenarios that may serve as early risk warnings.

On the planetary scale, Earth's climate is governed by factors such as heat

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3 Grey D., 'Water for growth and development.' *Theme document of the 4th World Water Forum*, Mexico City, March 2006.

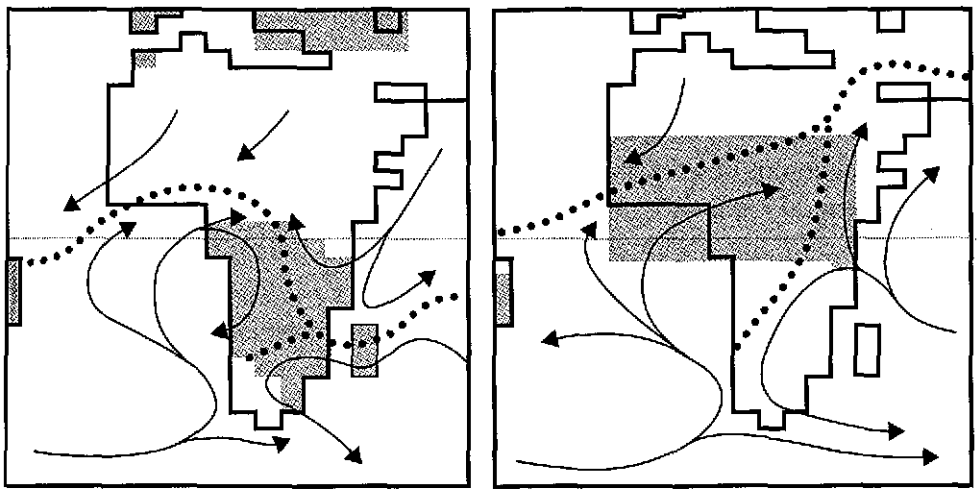

Figure 1: Observed climate of the surface flow patterns (arrows) and rainfall (shaded) over Africa for the austral summer months December, January and February (left) and the austral winter months June, July and August (right). Shaded areas represent annual continental rainfall total averages greater than 60 mm. The inter-tropical and inter-ocean convergence zones (ITCZ and IOCZ, respectively) are depicted by red thick dotted lines. Wind patterns are the sSouth-east trade winds (A), sSouth-west monsoon circulation (B), nNorth-east monsoon circulation (C) and nNorth-east trade winds (D).

Source: Adapted from Karoly D. & G. Vincent, Meteorology of the Southern Hemisphere, Boston: American Metereological Society, 1998 Karoly and Vincent, 1998.

differences between polar and equatorial regions, the rotational rate of the planet and the composition of the atmosphere. These factors produce forces in the flow dynamics of the atmosphere that allow for air masses to ascend over warmer equatorial regions, while descending over sub-tropical or temperate latitudes at approximately 30° north and south. The thermally driven meridional cells that emanate from this flow are known as Hadley cells. Hadley cell circulation has a noticeable influence on Africa's climate.

The inter-tropical convergence zone (ITCZ), also known as the heat equator, is the region where trade or monsoon winds from the Southern and Northern Hemispheres meet (convergence), and is therefore located over a region associated with ascending air masses (convection). The ITCZ normally occurs over the tropics, although it varies in location between summer and winter seasons. This variation is most significant over East Africa, where the ITCZ, on average, propagates as far south as Zimbabwe during austral summer seasons (Figure 1). However, its location might also vary from summer to summer, which might contribute to inter-annual rainfall variability.

As a result of warmer surface conditions at the ITCZ, surface winds blow towards the ITCZ. In the Southern Hemisphere, these winds are deflected towards

the left of the direction of flow by the Coriolis force – a force created by Earth's rotation. The deflected winds that then become general easterly (ie. blowing from the east) are known as trade winds. Where trade winds cross the geographical equator on their way to the ITCZ, they are again deflected towards the right of the direction of flow by the Coriolis force of the Northern Hemisphere, and become general westerly winds (ie. blowing from the west), and are then known as monsoon winds. Examples are the well-known Indian and West African monsoons (B and C in Figure 1).

With adequate moisture, convection at the ITCZ might result in lower surface air pressures and rainfall, while descending air masses (subsidence) at the sub-tropics of the Southern and Northern Hemispheres are normally associated with higher surface pressures and drought. Planetary-scale climate systems therefore, on average, cause wetter conditions over the ITCZ (mostly equatorial regions) and drier conditions over sub-tropical latitudes at approximately 30° south or north.[4]

Local factors such as topography and surface characteristics might lead to distinctive regional climate variation within the planetary-scale climate system. In addition, seasonal variability causes climate zones to shift on an intra-annual time scale, while inter-annual climate variability appears to be driven by complex processes in the ocean, on the land surface and in the atmosphere. From the latter, it becomes apparent that studies in climate variability and climate change are not trivial, especially when it comes to the prediction of climate.

Africa's climate may be classified into three zones, namely (1) humid equatorial zones, (2) dry arid zones, and (3) humid temperate zones. Humid equatorial zones (equatorial Africa) and dry arid zones (the Namib and Sahara Deserts) are predominantly the result of Hadley-cell-driven ascending and descending air masses, respectively, while rainfall over the humid temperate zones is rather caused by deviations over sub-tropical latitudes, where drier conditions are suppose to prevail (the eastern and central parts of North and Southern Africa, including the Sahel region). During rainfall events, the eastern parts of Southern Africa are normally fed by trade-wind-driven moisture flux from the Indian Ocean, while the central and south-eastern parts of Southern Africa often receive moisture from the tropics by means of so called tropical temperate troughs (bands of clouds that extend from north-west to south-east across sub-tropical Southern Africa). In the Northern Hemisphere, the West African monsoon plays an important role in regulating moisture flux over the sub-tropical Sahel of North

4 Karoly D. & G. Vincent, *op. cit.*

Africa. These systems vary in time and space. Higher climate variability therefore appears over the humid temperate zones of the sub-tropics, which makes climate prediction on the inter-annual and longer time scales challenging.

This chapter gives an objective overview of what scientists currently know about climate trends over Africa (in particular Southern Africa), and of what might happen to temperatures and rainfall in future as a result of both natural climate variability and anthropogenic (human-induced) greenhouse warming. It will be indicated that there is strong agreement among scientists that anthropogenic greenhouse warming might lead to increased air temperatures, although great uncertainty still exists about projected rainfall changes. The chapter will therefore focus more on rainfall over Southern Africa in an effort to produce evidence of trends in current rainfall patterns, and of what changes might be expected in future.

HISTORICAL CLIMATE RECORDS

Since the creation of Earth, approximately four billion years ago, the planet's climate has varied considerably. It was only recently that Earth's climate became suitable for life, especially human life. Apart from driving forces such as solar radiation and the rotational rate of Earth, which are currently fairly stable phenomena with a small degree of variability, the composition of the atmosphere appears to play an important role in sustaining climate. It is those gases and aerosols that contribute to Earth's radiation budget, such as greenhouse gases, that are of particular importance.

Natural greenhouse gases are essential in sustaining our present climate. In fact, if it were not for natural greenhouse warming, the global average temperature of the lower atmosphere would have been in the order of –18°C. Because of natural greenhouse warming, average temperatures of approximately –15°C are currently experienced. Existing natural greenhouse gases therefore already contribute to an atmospheric warming of more than 30°C, which indicates that modern life would not be possible without natural greenhouse gases. Greenhouse warming is therefore not only an unnatural threat, but also an essential contributor to the life-sustaining climate currently experienced on Earth.

Earth's climate is currently moving out of a moderate ice age (from the 14th to mid-19th centuries) associated with a cooling of less than 1°C, which was predominantly confined to the Northern Hemisphere. Crowley and Lowery, for example, argue that the little ice age was insignificant when compared to global

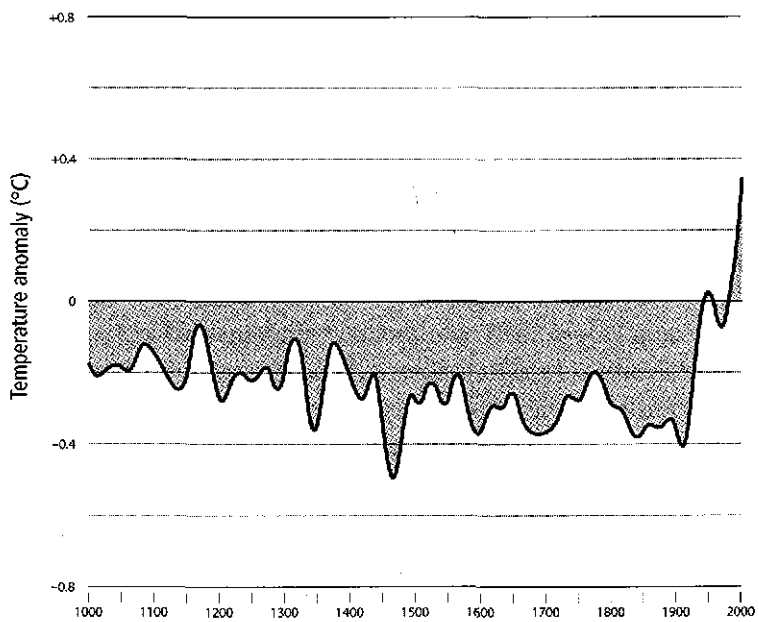

Figure 2: Departures from the 1961–1990 average of surface temperature, predominantly over the Northern Hemisphere, over the past 1,000 years (adapted from IPCC, 2001(a)).

Source: Adapted from IPCC (Intergovernmental Panel on Climate Change), Climate Change 2001: The Scientific Basis. A Contribution of Working Group I to the Third Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge & New York: Cambridge University Press, 2001.

mean temperature changes over the longer history of Earth.[5] In the longer term, Earth is at the peak of an inter-glacial warm period. It is already evident that this period is longer than the previous four warm inter-glacial periods experienced over the past 400,000 years (as recorded from ice core samples from the polar regions. However, for a long period of approximately 1,000 years, Earth's radiation budget appeared to be in close balance [Figure 2]), meaning that climate was not consistently drifting towards warmer or colder conditions. Under such conditions, one will obviously still find internal variability in the climate record, although no long-term trends or unusual deviations have appeared.

A concern is that global average surface air temperatures have started to increase since the 1860s, with most of the warming taking place during the 20th century. This increase is much higher than anything experienced over the past 1,000 years. It is believed that 2005 was the warmest year on record in the Northern Hemisphere, and the second-warmest year globally since the

5 Crowley T.J. & T.S. Lowery, 'How warm was the Medieval warm period?' *Ambio*, 29, pp. 51–54.

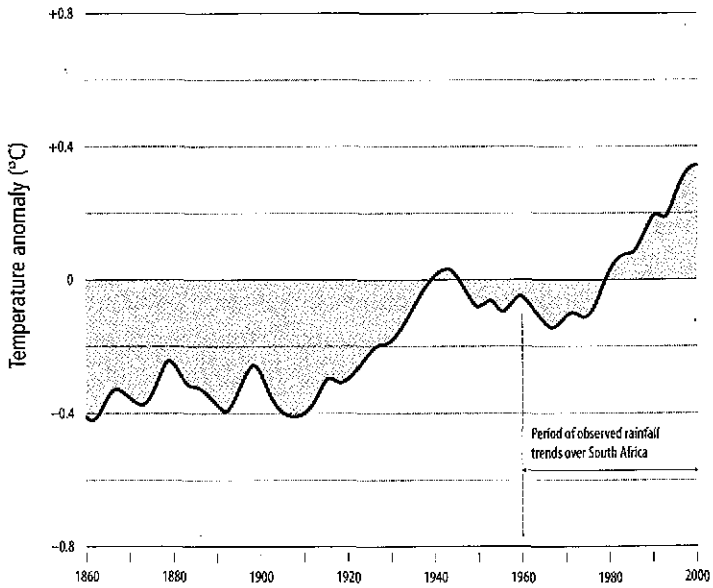

Figure 3: Departures from the 1961–90 average of global surface temperature over the past 140 years. Trend analysis of South African rainfall was done over the period 1960–2002 (see section 4.1.2).
Source: Adapted from IPCC, Climate Change 2001: The Scientific Basis, op. cit.

1860s. In 2005 temperatures greater than 0.65°C above the 1961–90 average (the baseline climate) were recorded (compare this to the positive anomaly of 0.35°C in Figure 3). Also note that the years 2002, 2003 and 2004 were among the warmest years on record. Since the 1860s, global surface temperatures showed an increase of approximately 0.7°C, which is abnormal compared to the record of the past 1,000 years (Figure 2). More disturbing is that the increase in temperature in the 20th century appears to be the largest of any century during the past 1,000 years.

There is increasing evidence that Earth is heating up at an unusual rate, and that the heating might even start to affect Earth's radiation balance. The radiation balance of absorbed solar radiation and emitted Earth system radiation, and surface albedo (reflection of radiation) are major parameters that determine Earth's climate. Disturbances in these parameters might have far-reaching implications for weather patterns, which undoubtedly will lead to disturbances and deviations in rainfall and temperature patterns.

HUMAN INFLUENCES

The climate of a region is governed by internal random variability within the atmosphere system, as well as by natural variations in radiative forcing from both Earth's surface and atmosphere. As previously mentioned, greenhouse warming is, to a large extent, a natural radiative forcing that is an essential contributor to the life-sustaining climate currently experienced on Earth. It is therefore an indisputable scientific fact that greenhouse gases warm the atmosphere. The most important greenhouse gases in the atmosphere are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O) and, last but not least, water vapour (H_2O). All these gases allow for a positive radiative forcing that warms the atmosphere. Note that some gases and aerosols, such as sulphate aerosols (SO_4), might also have a cooling effect (negative radiative forcing).

Natural inconsistent phenomena such as volcanic eruptions might, from time to time, release large concentrations of greenhouse gases into the atmosphere. These events do not occur frequently, and the disturbances are generally too small to affect Earth's climate in the long term. Climate might also be affected by external anthropogenic (ie. human) interference that might, in the long term, alter the natural balance in radiative forcing. If more greenhouse gases are consistently released into the atmosphere, global surface temperatures are most likely to rise.

Figure 4 (left-hand graph) shows that the concentration of CO_2 has increased by 31% since 1750. This concentration has not been exceeded over the past 400,000 years. The rate of increase is also exceptional, since it has not been recorded during at least the past 20,000 years. About 75% of anthropogenic CO_2 emissions are the result of fossil-fuel burning. Atmospheric concentrations of CH_4 and N_2O have increased by 151% and 17%, respectively, since 1750 (Figure 4, middle and right-hand graphs). Approximately half of the current CH_4 emissions and a third of the N_2O emissions are anthropogenic in origin.

Striking is the similarity between the rise in greenhouse gases (figure 4) and the rise in surface temperatures (figures 2 and 3) since the 1800s.

OBSERVED CLIMATE TRENDS: SOUTHERN AND EASTERN AFRICA

Recent rainfall and temperature trends

It has been indicated that Earth's global temperatures have gradually increased since 1750, and that the rate of temperature increase has accelerated over recent

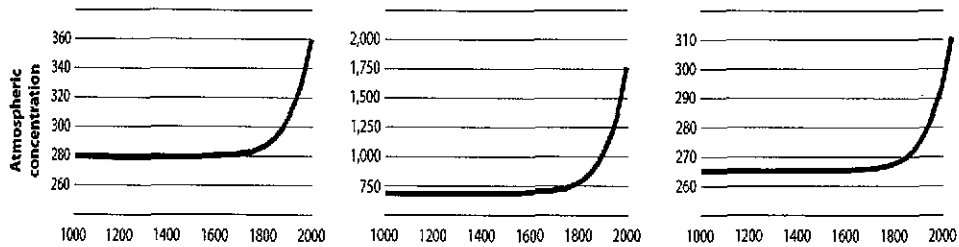

Figure 4: Concentrations of greenhouse gasses in the atmosphere since the year 1000. Note how these concentrations have increased since the Industrial Revolution in 1750, which is a clear indication of anthropogenic interferences.

Source: Adapted from IPCC, Climate Change 2001: The Scientific Basis, op. cit.*2001(a).*

years. There is good evidence to support the view that these changes are attributed to anthropogenic interference. Anthropogenic greenhouse warming is therefore already a reality and must not be seen as a problem of the future. It is most likely that the influence of enhanced greenhouse warming on weather systems, and therefore temperature and rainfall, is already captured in existing observational records in the form of consistent trends. These existing trends might serve as valuable indicators of future weather system changes under ongoing conditions of greenhouse warming, since it is unlikely that the atmospheric circulation will in future rapidly deviate towards the opposite direction of what is currently being observed. However, unreliable and limited data records over Southern Africa make it sometimes difficult to calculate consistent trends in climate. For example, in some areas in western Southern Africa it is simply not possible to produce any trend analysis. The following two sections give an overview of trends in temperature and rainfall as observed over the past few decades with the best observational data available.

African temperature and rainfall trends

Because of limited data, it is not always possible to construct a long climate record for all countries in Africa. This especially applies to the western and north-central parts of Africa south of the Sahara. There are, however, countries with suitable records, which allows for the calculation of trends in both temperature and rainfall. Figure 5 gives an indication of more recent (1976–2000 = 25 years) temperature and longer-term (1900–2000 = 101 years) rainfall trends over most of Southern and Central Africa. The specific magnitude of trends is not shown, but only the direction (warming/cooling or wetter/drier).

With the exception of regions along the west coast of South Africa and northern Kenya and Ethiopia, Africa south of the Sahara appeared to become consistently

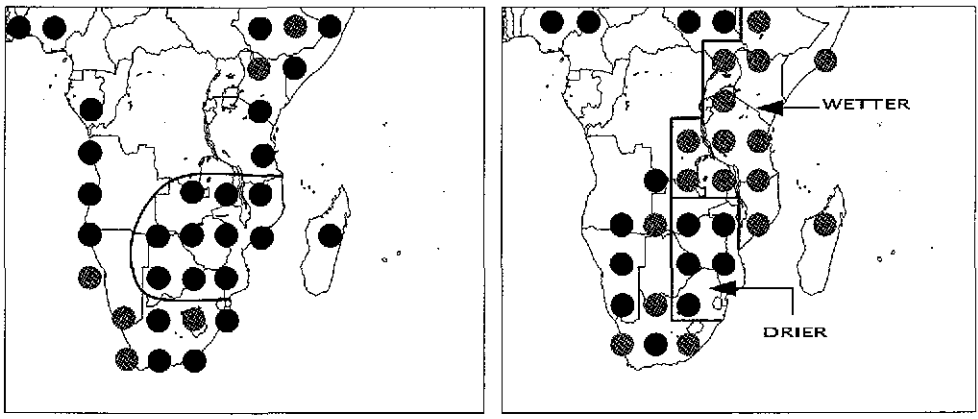

Figure 5: Warming (black) and cooling (grey) annual temperature trends from 1976 to 2000 (left) and drier (black) and wetter (grey) annual rainfall trends from 1900 to 2000 (right) (adapted from IPCC, 2001(b)).
Source: Adapted from IPCC, Climate Change 2001: Synthesis Report. *A Contribution of Working Groups I, II, and III to the Third Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge & New York: Cambridge University Press, 2001.*

warmer over the past 25 years (Figure 5, left-hand figure). This warming trend is found to be most profound over Zimbabwe and Zambia, where devastating prolonged droughts prevailed over the same period.[6]

Increased as well as drying rainfall trends had occurred over the past 101 years in Africa south of the Sahara (Figure 5, right-hand figure). Mixed signals appear over the western domain of the continent, most probably due to the naturally dry climate associated with low rainfall totals. More spatially coherent are rainfall trends over the eastern part of the region, where a drying trend was detected over the north-eastern part of South Africa, as well as over Zimbabwe and the eastern part of Botswana. Interesting are the wetter trends that have been calculated over northern Mozambique, northern Zambia, Tanzania, Uganda and Kenya. It is particularly agriculture in the Zambia–Zimbabwe–Malawi region that was most effected by the warming and drying trends over recent decades, and it is known that these countries have suffered severe food shortages over recent years.

South African rainfall trends

Most rainfall records over South Africa do not go far back into history, especially records of stations that cover extensive parts of the country. In Rautenbach and Mphepya, an effort was made to detect spatial trends in observed rainfall from

6 Not shown here. Details can be found in the source for Figure 5.

the most consistent and widely spread rainfall records currently available.[7] A data set from the South African Weather Service, containing a total of 1,027 South African rainfall stations with observations over 42 years (1960–2001), had been identified as suitable for this trend analysis (in Figure 3, the timespan of this record is compared to the global greenhouse warming temperature record since 1860). The concentration of rainfall stations is, for obvious reasons, higher over more-densely populated areas, such as the eastern and southern parts of the country. Fewer stations per area appear in the drier regions of the Northern Cape Province, although the spatial coverage is regarded as still suitable for the investigation.

As a first attempt, a time series of spatially averaged annual rainfall totals over the entire country was calculated (Figure 6). The regression line in Figure 6 (dotted line) indicates a gradual positive trend in the spatially averaged annual rainfall totals of South Africa. However, extreme rainfall events, such as the high rainfall of 1974 and 1976, and the extremely low rainfall of 1992, might have influenced the slope of the regression line. It is interesting to note that although a positive trend appears in the regression line, two of the lowest rainfall episodes on record (1992 and 1999) were recorded in more recent years, while the wettest years (1974 and 1976) appeared earlier in the time series.

Associated spatial trend patterns calculated from the 1,027 individual rainfall station records (not shown) have indicated that no statistically significant trends

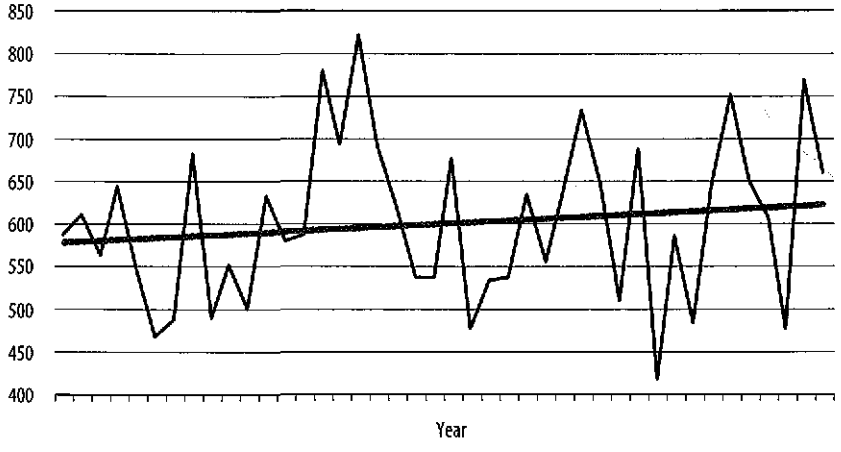

Figure 6: The 42-year time series of spatially averaged annual rainfall totals as calculated from 1,027 rainfall stations over South Africa, with the regression line fitted through the data (from Rautenbach and Mphepya, 2005).

Source: Rautenbach CJdeW & J Mpheya, op. cit..

7 Rautenbach, C.J. de W & J. Mphepya, *Observed Rainfall Trends over South Africa: 1960–2001.* Research report submitted to ESKOM, report no. RES/RR/04/25332, 2005.

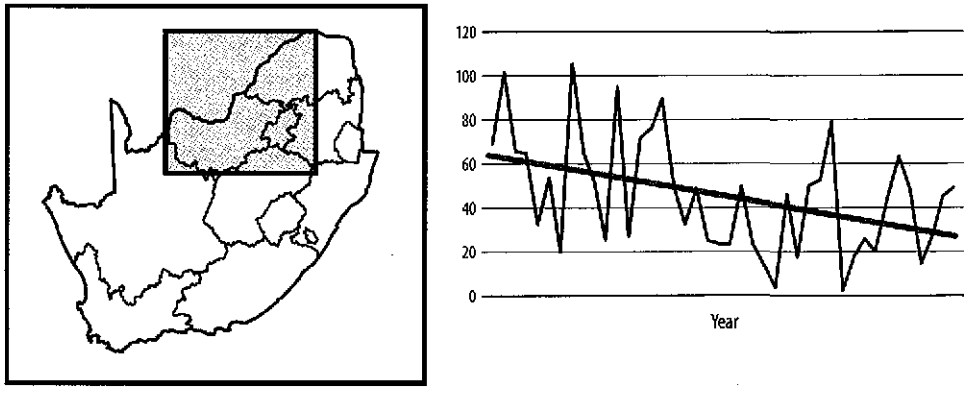

Figure 7: A statistically significant negative rainfall total trend was calculated for April (1960– to 2001) over the greay domain (left). A time series of spatially averaged rainfall totals over this domain is depicted on the right (from Rautenbach and Mphepya, 2005).

Source: Figures 7–10 adapted from Rautenbach CJdeW & J Mphepya, op. cit.

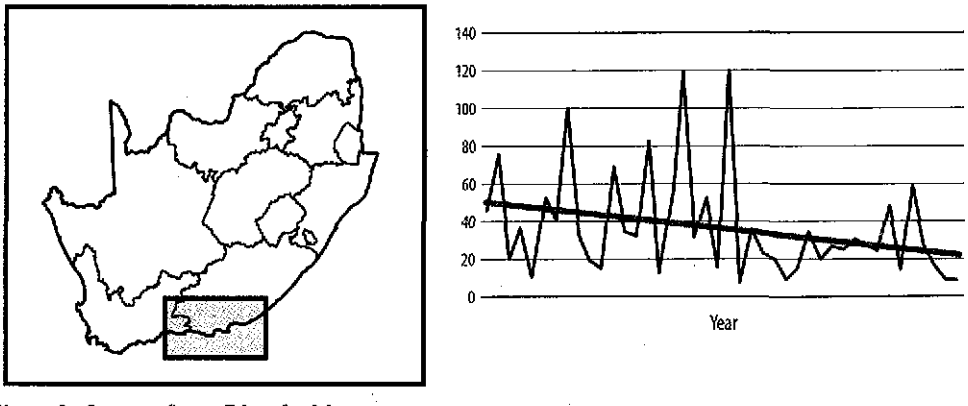

Figure 8: Same as figure 7 but for May.

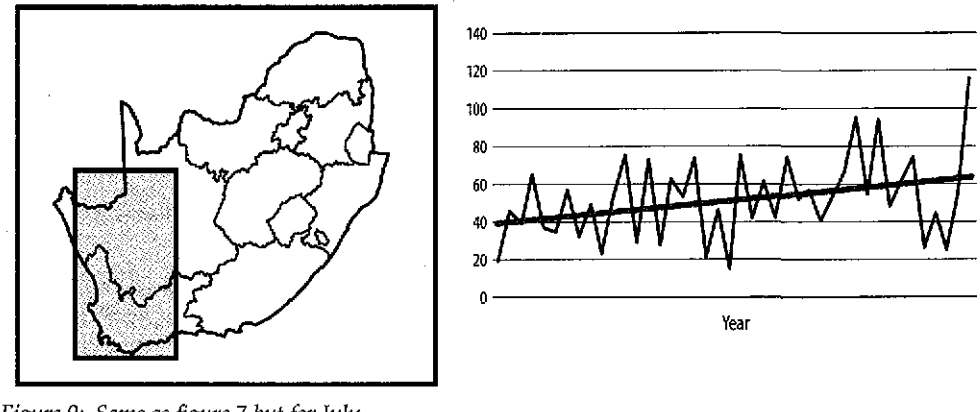

Figure 9: Same as figure 7 but for July.

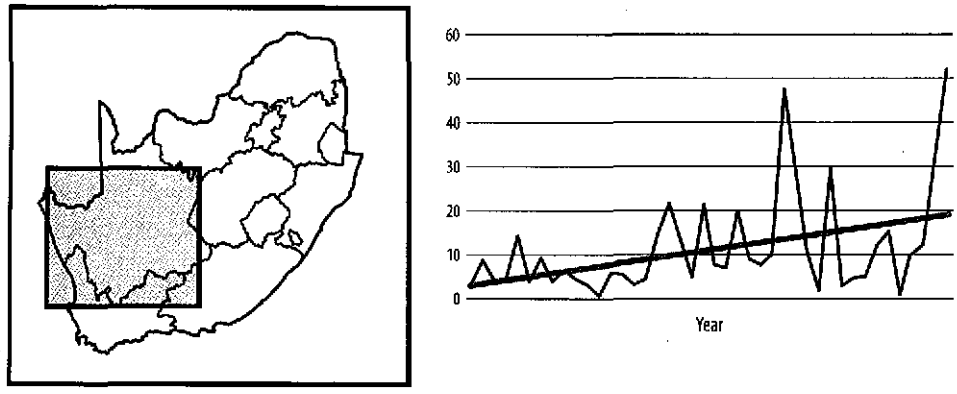

Figure 10: Same as figure 7 but for September.

had appeared in South African annual rainfall totals – at least over the past 42 years. This is an important finding, because it indicates that despite enhanced greenhouse gas concentrations that were measured over the same time period in the atmosphere, annual rainfall totals did not change significantly over South Africa.

A following step was to investigate South African rainfall total trends on an intra-annual time scale (seasonal or monthly). Analyses on six-monthly averaged rainfall total data did not reveal any significant trends, and the trends that were found could easily be linked to more significant trends that were found in monthly rainfall total records.

The four grey areas depicted in Figures 7–10 were identified as those with the most statistically significant monthly rainfall total trends. The first two areas, which were identified in the months April and May (late summer), both had negative rainfall total trends (Figures 7 and 8), while the areas for July and September (late winter) both had positive rainfall total trends (Figures 9 and 10).

These findings indicate that the only significant change in rainfall totals over the past 42 years was that the austral late-summer season (October to March) became drier over the summer rainfall region, while the austral late-winter season (April to September) became wetter over the western coastline and interior.

The finding is indicative of a seasonal shift in South African rainfall, leading to drier conditions in the late summer and early winter over the central and south-eastern summer rainfall region, and wetter conditions in the late winter and early summer over the western coastline and interior. If this shift is attributed to enhanced greenhouse warming, we could expect to find a similar shift in

future greenhouse warming projections of rainfall totals. If not, the debate about future rainfall projections over South Africa might still be overwhelmed by great uncertainty for a long time.

FUTURE CLIMATE PROJECTIONS

The IPCC initiative

The most comprehensive international effort to predict the response of Earth's weather and climate to increased anthropogenic greenhouse gases is known as the Inter-Governmental Panel for Climate Change (IPCC) initiative. A *Third Assessment Report* (TAR) of the IPCC was adopted in 2001. This report consists of the three IPCC Working Group contributions and the *Synthesis Report*,[8] among others. Results represent nearly three years of work by approximately 1,250 lead and contributing authors. Comments from approximately 1,000 government and expert reviewers were received. The *Synthesis Report* addresses nine policy-relevant scientific, technical and socio-economic questions.[9] It draws together and integrates for the benefit of policymakers and others information that has been approved and/or accepted by the IPCC.

A major component of the TAR was to produce future climate change scenarios. The only scientific resources currently available to produce some degree of guidance of what might be expected in future climates are coupled atmosphere–ocean global climate models (GCMs).[10] *As part of the 2001 IPCC initiative, GCM-simulated future climate change projections for Earth were prepared by forcing six of the most advanced GCMs in the world with different future greenhouse gas and aerosol emission scenarios (see section 5.2).*

Six of the IPCC GCMs used for this purpose were:

- Canadian Centre for Climate Modelling and Analysis (CCCma);
- Australian Commonwealth Scientific & Industrial Research Organisation (CSIRO);
- German Climate Research Centre (ECHAM4/OPYC3);
- US Geophysical Fluid Dynamics Laboratory (GFDL99);

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8 IPCC, *Climate Change 2001: The Scientific Basis, op. cit.*; IPCC, *Climate Change 2001: Synthesis Report, op. cit.*

9 IPCC, *Climate Change 2001: Synthesis Report, op. cit.*

10 GCMs are computer programs that numerically solve the prognostic equations of the flow dynamics of the atmosphere or ocean over long periods where energy is conserved – no numerically induced drift. They also include complex parameterisation of radiation, surface processes and rainfall. GCMs have the potential to reproduce Earth's climate, but they might differ slightly because of different numerical and parameterisation techniques used.

- UK Hadley Centre for Climate Prediction and Research (HadCM2); and
- Japanese Centre for Climate System Research (CCSR/NIES99).

Model simulations were performed on some of the most powerful supercomputers in the world. Output results were archived and made available to the global research community. Many research findings based upon these results were published as scientific papers, from which the most important findings for Southern Africa are summarised in section 5.3 of this chapter.

Emission scenarios

Future climate change projections are simulated by forcing GCMs with estimated future atmospheric concentrations of greenhouse gases and aerosols, also known as future emission scenarios. Two of the most commonly used emission scenarios are the A2 and B2 Special Report on Emission Scenarios (SRES).[11] SRES are linked to different projected pathways of population growth and economic development, which add to the uncertainty in future climate change studies. The A2 SRES is regarded as an extreme category scenario that might represent a 'worst-case scenario', while the B2 SRES is a more moderate and environmentally friendly emission scenario. These two scenarios may be summarised as follows.

A2 SRES (Figure 11) describes a very heterogeneous world. The underlying theme is self-reliance and preservation of local identities. Fertility patterns over regions converge very slowly, which results in a continuously increasing population (estimated at 15 billion by the year 2100). Economic development is primarily regionally oriented, and per capita economic growth and technological change more fragmented and slower than other SRES.

B2 SRES (Figure 11) describes a world in which the emphasis is on local solutions to economic, social and environmental sustainability. It is a world with continuously increasing global population (estimated at 10.4 billion by the year 2100), at a rate lower than the A2 emission scenario. While the scenario is also oriented towards environmental protection and social equity, it focuses on local and regional levels.

IPCC projections for Southern Africa

Scatter plots of IPCC GCM (section 5.1) projected average surface air temperature

11 IPCC, *Special Report on Emission Scenarios by Working Group III, Intergovernmental Panel on Climate Change*. Cambridge & New York: Cambridge University Press, 2001.

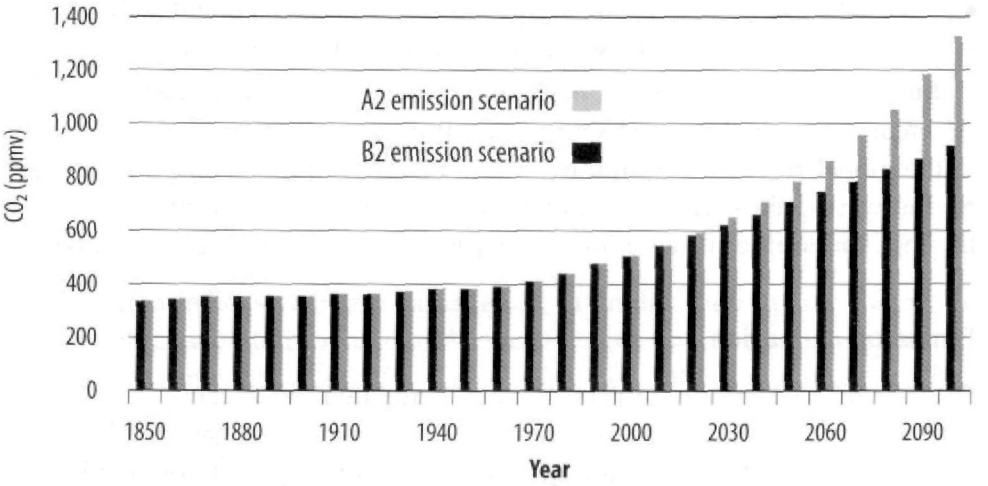

Figure 11: The A2 and B2 emission scenarios used to force GCMsGlobal Climate Models. The A2 scenario is a less- optimistic greenhouse- gas- release scenario that projects a doubling in greenhouse gasses over the following 100 years, while the B2 scenario is more optimistic. (adapted from IPCC, 2001(c)).
Source: IPCC, Special Report on Emission Scenarios, *op. cit.*

versus daily rainfall relative to a 40-year baseline climate (1961–90) for December–January–February 2020s and 2050s are illustrated in Figure 12 (left) and (right), respectively. The scatter plots illustrate rainfall deviations from the present climate (average of 1961–90) as a result of greenhouse warming on the vertical axis, and surface air temperature deviations from the present climate as a result of greenhouse warming on the horizontal axis, as simulated by the six different IPCC GCMs. The associated plots for June–July–August are depicted in Figure 13. In these simulations, the more extreme A2 SRES (Figure 11) had been considered.

Scatter plots in both Figures 12 and 13 favour anomalously positive projections in average surface air temperatures among all the IPCC GCMs over Southern Africa (south of the equator). Projected temperature increases vary from 1°C to 1.5°C in the 2020s, and from 2°C to 3°C in the 2050s. In contrast, daily rainfall projections are noticeably scattered from above to below normal rainfall for both the summer and winter seasons of the 2020s and 2050s. The 2001 IPCC initiative therefore projects a possible future warming over Southern Africa under conditions of enhanced anthropogenic greenhouse warming, but has failed to produce any inter-model consistency in projected rainfall patterns. This implies that observed rainfall trends over Southern Africa, under existing conditions of greenhouse warming, might still be the most appropriate guideline to what might happen with future rainfall over the region. Observed rainfall

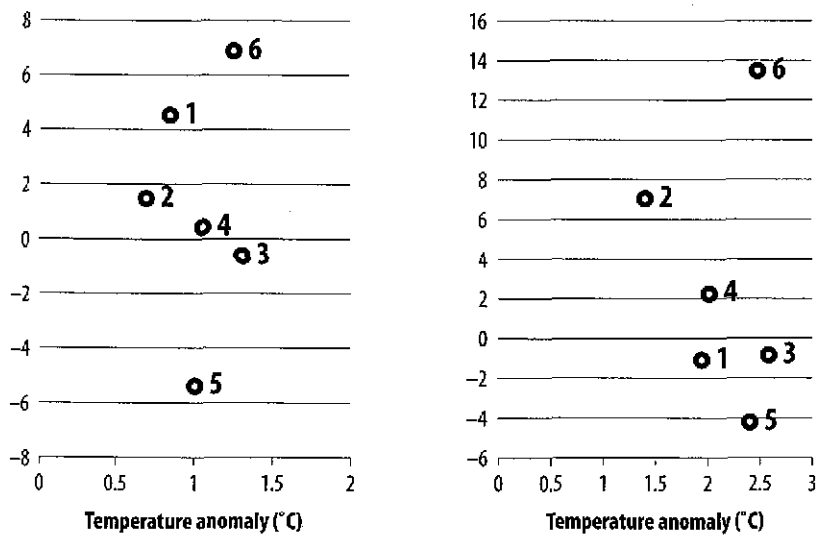

Figure 12: Average surface air temperature versus daily rainfall scatter diagram for Ssouthern Africa (adapted from Ruosteenoja et al. (2003)) of IPCC GCM (1. CCCma, 2. CSIRO, 3. ECAM4, 4. GFDL99, 5. HadCM3 and 6. Nies99 models) projections for December—January—February 2020s (left) and December--January—February 2050s (right) relative to 1961—1990.

Source: Adapted from Ruosteenoja K, TR Carter, K Jylhä & H Tuomenvirta, Future Climate in World Regions: An Intercomparison of Model-based Projections for the New IPCC Emissions Scenarios. The Finnish Environment 644, *Finnish Environment Institute, 2003.*

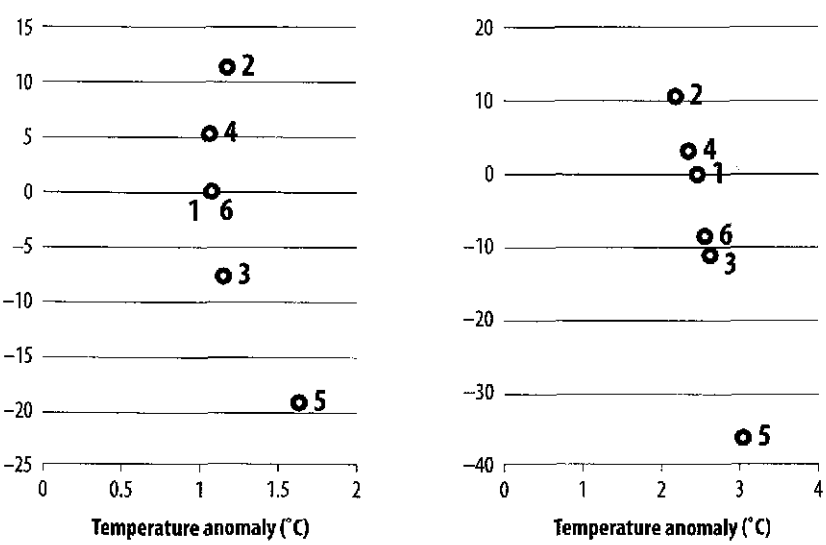

Figure 13: Average surface air temperature versus daily rainfall scatter diagram for Ssouthern Africa (adapted from Ruosteenoja et al. (2003)) of IPCC GCM (1. CCCma, 2. CSIRO, 3. ECAM4, 4. GFDL99, 5. HadCM3 and 6. Nies99 models) projections for June--July--August 2020s (left) and June—July—August 2050s (right) relative to 1961—1990.

Source: Adapted from Ruosteenoja K et al., op. cit.

trends were discussed in sections 4.1.1 and 4.1.2. In the following section we will look at results from a regional model, which we will then compare to the previous trend results in order to produce a possible scenario for rainfall over Southern Africa.

COMPARISON BETWEEN OBSERVED TRENDS AND REGIONAL MODEL PROJECTIONS

Due to great uncertainty in producing rainfall projections with IPCC GCMs for Southern Africa under conditions of enhanced greenhouse warming, it became essential to use other guidelines such as observed rainfall trends when examining model-simulated future trends. At the University of Pretoria, a global–regional (stretched grid) atmospheric model was used to simulate future rainfall trends for the period 2071 to 2100 under A2 SRES conditions. The model used was the Conformal Cubic Atmospheric Model (C-CAM) developed by the CSIRO Marine and Atmospheric Research in Australia. This global–regional model received input from climate change simulations performed by the new CSIRO Mark III GCM. Unlike many other regional models, C-CAM does not require any lateral boundary input, since it is not nested into results of a GCM. It was rather nudged with GCM results, which is an advantage, since this avoids errors that propagate from lateral boundaries. GCM simulations were the latest performed and form part of a new IPCC initiative. Both C-CAM and the CSIRO Mark III GCM can be placed among the world's best atmospheric models currently available.

C-CAM simulations were first performed over the period 1975–2005 using observed greenhouse gas concentrations to create a baseline climate.[12] Subsequently, a 30-year projection (2071–2100) had been completed considering the A2 emission scenario. Projection results of annual rainfall totals, expressed as a percentage change from the baseline climate, are depicted in Figure 14.

Figure 14 indicates an expected future drying over most of Southern Africa. Wetter conditions, however, were simulated over central and northern Mozambique, Tanzania, Malawi and eastern Zambia. Western Zambia and Zimbabwe receive below baseline rainfall totals in the simulations. The western parts of Southern Africa seem to become drier, with mixed signals over South

12 Engelbrecht F.A., 'Simulations of climate and climate change over southern and tropical Africa with the Conformal-Cubic Atmospheric model', in Schulze R.E. (ed), *Potential Impacts and Vulnerabilities of Climate Change on Hydrological Responses in Southern Africa*. WRC Report 1430/1/05. Pretoria: Water Research Commission, 2005, chap. 4.

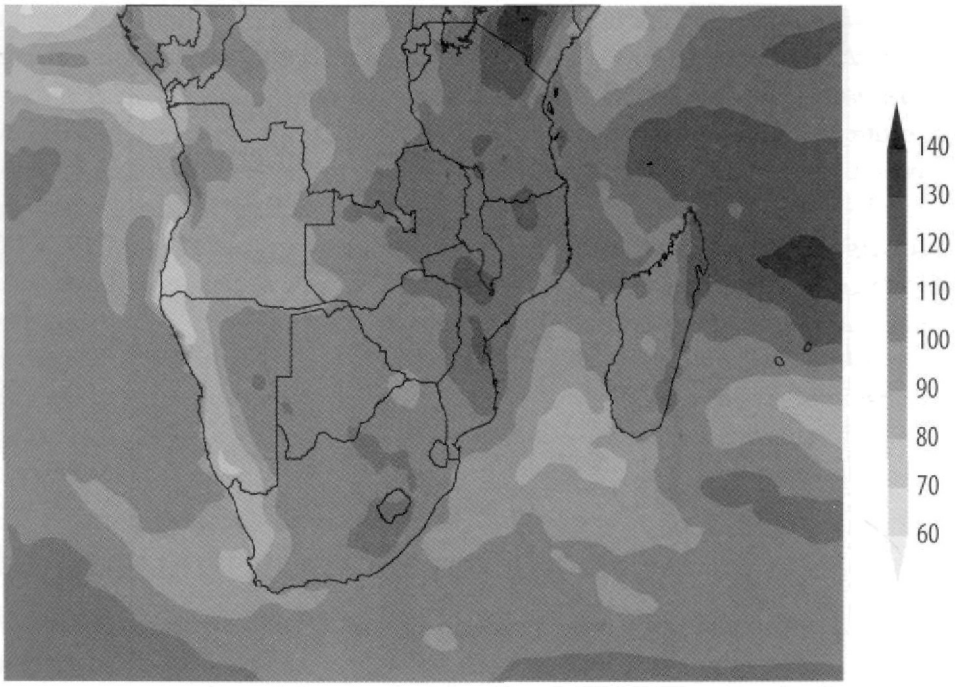

Figure 14: Projected annual rainfall total change for the period 2071– to 2100 (% change from the 1975– to 2005 average) due to enhanced greenhouse gas concentrations (A2 SRES scenario).
Source: Results are from a global—regional model simulation by the Conformal Cubic Atmospheric Model (C-CAM).

Africa. Comparisons between future projections (Figure 14) and observed trends (Figure 5 [right]) are striking, since it appears as if the global–regional model projections are only an extension of the existing trends in annual rainfall totals over Southern Africa. These are encouraging results, since observed trends and model-simulated projections both indicate similar anomaly patterns in annual rainfall totals, which makes sense, since we are already well into the epoch of enhanced greenhouse gas global warming.

A possible explanation for the drying trends over south-eastern Africa and wetter trends over north-eastern Africa might be a gradual strengthening of the eastern continental mid-level high-pressure system that extends from the Indian high-pressure system over the African continent, or an increase in the frequency with which this high occurs over the African continent (Figure 15). Such conditions might lead to drought below the area of high pressure, while it will enhance Indian Ocean moisture flux towards the African continent in the north, since trade winds will strengthen when the high intensifies. These conditions might even result in more rain over the drier south-western part of

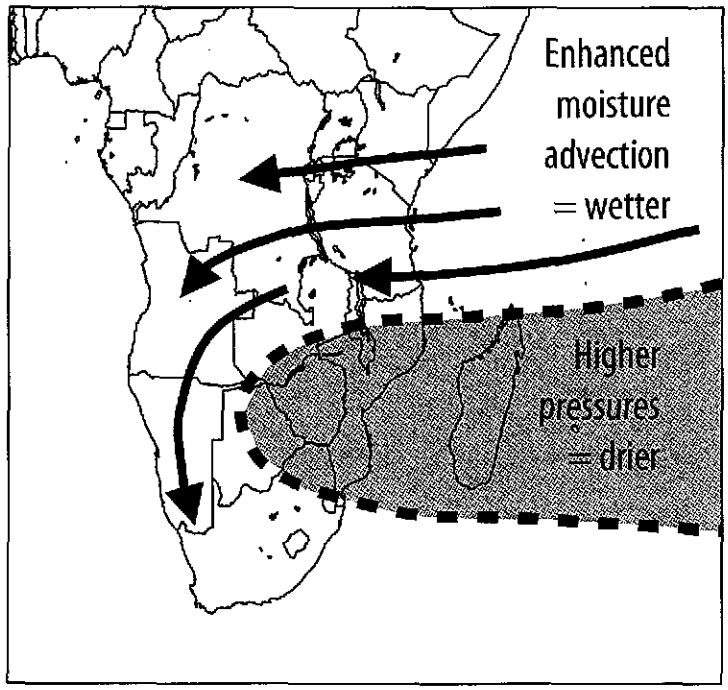

Figure 15: Greenhouse warming might strengthen the Indian hHigh- pressure system (mid-level high) to cause drought over the continent (greay area), while stronger moisture advection from the Indian Ocean trade winds might lead to more rain over regions to the north and west of the continental high.

Southern Africa, as a result of a strengthening or westward displacement of the southward moisture flux curvature around the continental high. This interesting hypothesis, however, still needs to be investigated in more detail and needs to be confirmed when longer data records become available.

The most important finding, however, is that the drying over the Zambia and Zimbabwe regions, and the wetter conditions over the eastern coastline and interior, with mixed signals over South Africa, are evident in both the observations (Figures 5 and 6) and model-simulated projections (Figure 14) of annual rainfall totals.

OTHER PROJECTIONS AND OPINIONS

An investigation by Hulme *et al* concludes that increased greenhouse gas concentrations might lead to warmer temperatures, as illustrated in section 5.3, over Southern Africa.[13] They also suggest a general drier climate with increased

13 Hulme M., R. Doherty, T. Ngara, M. New & D. Lister, 'African climate change: 1900–2100', *Climate Research, 17*, 2001, pp. 145–68.

rainfall variability; in other words, decreased annual precipitation with more severe rainfall events and flooding. No detail about the spatial extent of the drying is provided. Meadows[14] used results from an empirical downscaling model by Hewitson and Crane,[15] which projects the possibility of more rain days in future over most of South Africa and less rain days over the winter rainfall region, as well as projected drier conditions as interpreted from the IPCC GCMs results, to investigate the impact of climate change on agriculture, rangeland, forestry, water resources and health over Southern Africa. He concludes that the vast majority of the Southern African population has an increased vulnerability to impacts of future climate change. Such vulnerability is already evident in widespread food insecurity across the region, especially in the less-developed countries of Mozambique, Lesotho, Swaziland, Namibia and Zimbabwe.[16]

POTENTIAL IMPLICATIONS FOR AFRICA

Parry *et al* conducted the latest and probably most comprehensive study on the impact of climate change on global food production under SRES and socio-economic scenarios.[17] The impacts were estimated by using climate output from the HadCM3 GCM, which is a more advanced version of the HadCM2 GCM used in the 2001 IPCC initiative (see section 5.1). Results indicated that most of the world appears to be able to continue to feed itself during the rest of this century. However, these results were obtained through production in the developed countries compensating for declines projected for most developing countries.

In their study, Parry *et al* come to a number of major conclusions. The first is that climate change has a moderate negative impact on the simulated world crop yield. Secondly, climate change is likely to increase the disparities in cereal yields between developed and developing countries in a more significant way than has been found in previous studies. While global food production appears stable,

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14 Meadows M.E., 'Global change and southern Africa', *Geographical Research*, 44, 2, 2005, pp. 35–145.

15 Hewitson B.C. & R.G. Crane, 'Consensus between GCM climate change projections with empirical downscaling: Precipitation downscaling over South Africa', *International Journal of Climatology*, 26, 2006, pp. 1315–37.

16 Misselhorn A.A., 'What drives food insecurity in southern Africa? A meta-analysis of household economy studies', *Global Environmental Change*, 15, 2004, pp. 33–43.

17 Parry M.L. *et al., op. cit.*

regional differences in crop production are likely to grow stronger through time, with substantial increases in risk of hunger among the poorer nations.[18]

According to climate change projections from this chapter, it would be the Zimbabwe–Zambia–Malawi region that might suffer most from climate change, since it was found that this region already experiences prolonged droughts, and it is envisaged that these droughts, associated with increasing surface air temperatures, might prevail in future. This might result in a reduction of the maize yield, which might pose a threat to food security in the region. The natural dry west of Southern Africa might become slightly drier, while the far eastern area (from central Mozambique northwards) might expect to receive more rain in future. Signals for South African rainfall are mixed, with little evidence of strong consistent rainfall trends in observations and climate change simulations, although some studies indicate a shift in season[19] and an increase in the number of rain days over the summer rainfall region.[20] It is not only rainfall that might have an impact on agriculture and food security over Africa, but also the increase in temperatures. Increased temperatures, for example, might lead to higher evaporation and an increased demand for more irrigation that might reduce water resources, even without a decrease in rainfall. The debate around climate change impact assessment then becomes a multi-variable problem that might become extremely complex.

As mentioned in Parry *et al*, Southern Africa should plan not just to avoid a warmer and drier/wetter environment, but also to look for ways to adapt to a more uncertain environment where in certain regions the risk of crop failure on a year-to-year basis is likely to increase.[21]

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18 *Ibid.*
19 Rautenbach C.J. de W & J. Mphepya, *op. cit.*
20 Hewitson B.C. & R.G. Crane, *op. cit.*
21 Parry M.L. *et al.*, *op. cit.*

Chapter 2

Overview of the Global Status of Agricultural Biotechnology

Jocelyn Webster, David Keetch and Bryonie Guthrie[1]

INTRODUCTION TO AGRICULTURAL BIOTECHNOLOGY

Agricultural biotechnology, in simple terms, is the use and modification of living things to make useful agricultural products for the benefit of humankind. More scientifically, it can be defined as any technique that uses living organisms, or substances from these organisms, to beneficially make or modify an agricultural product.

Agricultural biotechnology is not a new technology. Humankind has been manipulating living organisms for thousands of years. Three thousand years ago, civilisations were using selected strains of yeast to make bread, beer and wine, while selected strains of bacteria were used to extract minerals from ore. For the past 500 years many crops have been selectively bred, and since 1920 this technology has made it possible to increase crop yields six-fold. Figures 1-3 present images of how selective breeding has created the staple crops we consume today.[2] These images show that centuries of selective breeding have rearranged thousands of genes to produce the foods we eat today. Plant biotechnology is simply an extension of the practices we have been using for centuries already and allows scientists, breeders and farmers to develop high-yielding and disease-free plants that offer consumers new properties in their foods.

Figure 4 shows a number of different crops that have developed from a single variety over centuries of breeding.

Agricultural biotechnology is vital to addressing the chronic food shortages in sub-Saharan Africa. Despite the green revolution, yields in the region have *hardly changed in 40 years and cereal production per capita is steadily declining.*

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1 PROF. JOCELYN WEBSTER is the Executive Director of AfricaBio; DR DAVE KEETCH runs Goldamer Consulting cc and was closely associated with the development of South Africa's GMO Act 1997; BRYONIE GUTHRIE is a Research Analyst with AfricaBio.

2 Chassy B.M., 'Coping with facts and fantasies about GMOs.' Presentation at AfricaBio, Johannesburg, 2006.

Figure 1: Maize

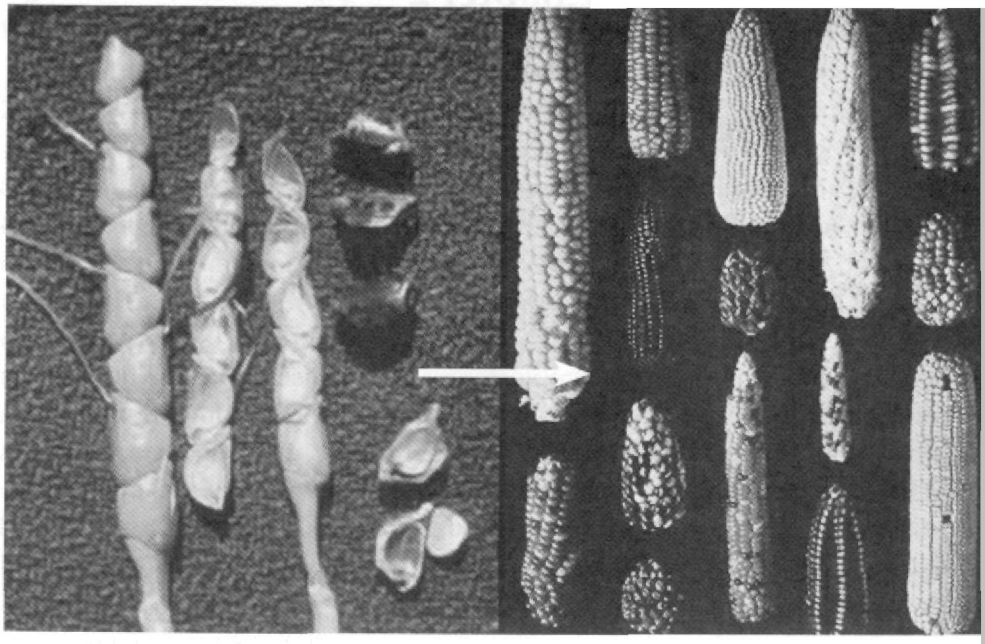


Figure 2: Lettuce

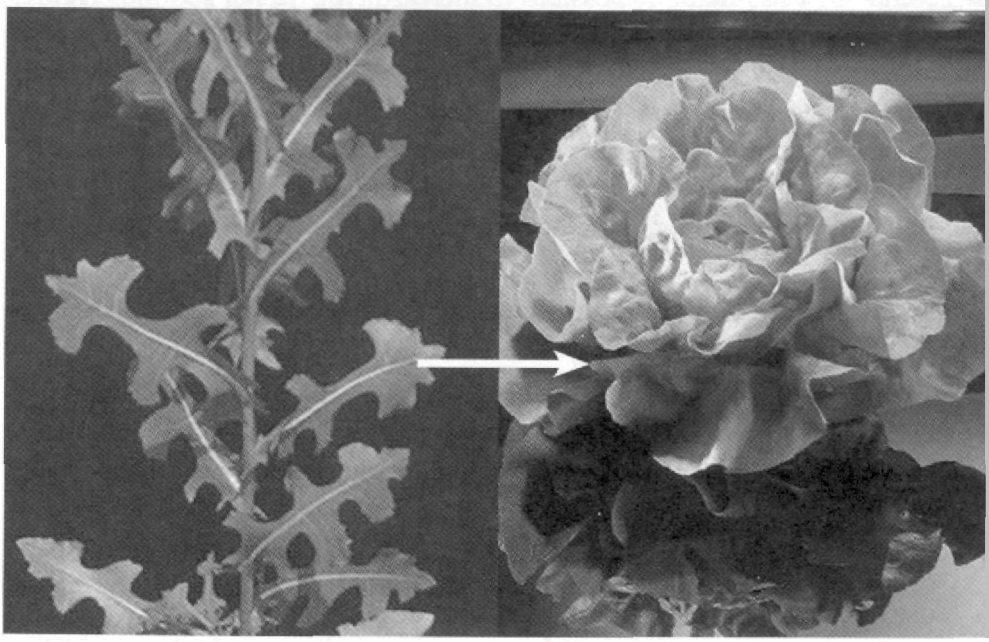


Figure 3: Carrots

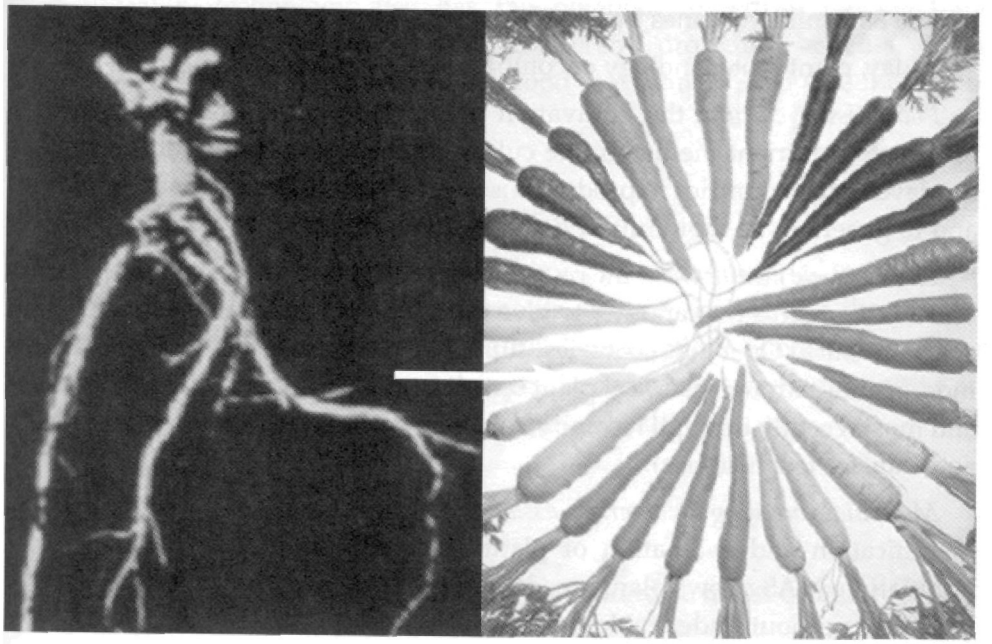
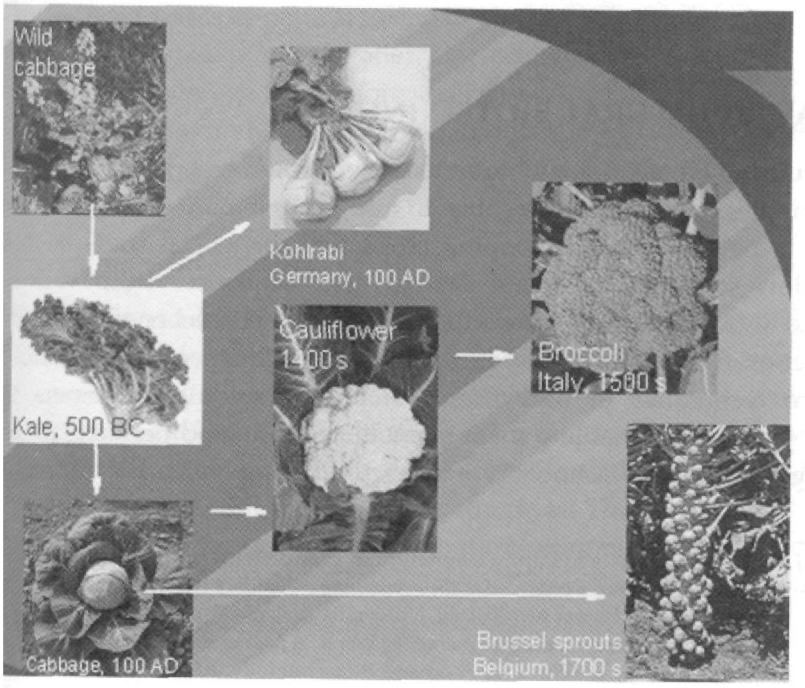


Figure 4: Crops developed over centuries of breeding



It has been estimated that with current yields the projected shortfall of cereals will be 88.7 million tonnes by 2025.[3]

Today, plant biotechnology encompasses three major areas:

Plant tissue culture: the cultivation of plant tissue or organs on specially formulated nutrient media. Tissue culture is seen as an important technology for developing countries to produce disease-free, high-quality planting material and to generate the rapid multiplication of uniform plants.

Plant genetic modification: the process whereby genetic material is moved from one living organism to another to give the recipient organism useful or desired characteristics. Over the centuries, humankind has learned to accelerate this modification through classical plant breeding and selection, induced mutations, and most recently through recombinant DNA (rDNA) techniques (gene isolation and transfer technologies).

Molecular breeding or marker assisted selection (MAS): a process enabling identification and evaluation of plants carrying useful traits in a breeding population. MAS allows plant breeders to develop crops with specific beneficial traits and without undesirable traits.

Any living organism that has had a gene or genes inserted into it or has been genetically modified by modern biotechnology techniques is called a GMO. Foods and products derived from these GMOs are termed GM foods or GM products.

MODERN AGRICULTURAL BIOTECHNOLOGY

Modern agricultural biotechnology began as conventional crop breeding. With modern techniques, scientists were able to use recombinant DNA (rDNA) techniques as a new tool for developing crops with beneficial traits. rDNA techniques allow scientists to isolate desired gene sequences from various organisms and introduce them into other organisms. These beneficial traits include protection from harmful insects and resistance to specific herbicides.[4] These modern techniques of agricultural biotechnology allow farmers to increase their yields, thus enabling them to produce more food per acre; at the same time, agricultural biotechnology can be used to enhance the nutritive

3 Thompson J.A., 'Research needs to improve agricultural productivity and food quality, with emphasis on biotechnology.' *Paper presented at the symposium on Feeding the World in the Coming Decades, Department of Molecular and Cell Biology*, University of Cape Town, 2002.

4 Pew Initiative on Food and Biotechnology, *Feeding the World: A Look at Biotechnology and World Hunger.* Washington, DC: Pew Initiative on Food and Biotechnology, 2004.

value of staple foods, which may improve overall human nutrition and health. Agricultural biotechnology also has the potential to reduce the need for chemicals, pesticides, water and tilling, thereby providing benefits to the environment as well as to the livelihood of farmers and the health of consumers.

Benefits of agricultural biotechnology

The benefits of agricultural biotechnology are wide-ranging and diverse. Table 1 represents just some of the benefits already experienced through the application of biotechnology to agricultural production. Thereafter, a list of additional benefits is provided and the specific areas biotechnology benefits are discussed, such as the environment and human health.

Other benefits include:

- more effective use of fertilisers;
- drought- and flood-tolerant plants;
- plants more tolerant to soils with high salt and toxic metal content;
- plants more tolerant to heat or cold;
- more nutritious composition of foods;
- rapidly growing crops;
- improvements in taste and quality of food;
- reduced levels of natural toxins in plants;
- reduced levels of natural allergenic proteins;
- extended storage time before spoilage;
- vegetables with higher anti-oxidant levels than current varieties; and
- fruit and vegetables with higher vitamin content.

Environmental benefits

Beyond agricultural benefits, products of crop biotechnology offer many environmental and economic benefits. Biotechnology crops allow us to increase crop yields by providing natural mechanisms for pest control in place of chemical pesticides. These increased yields can occur without clearing additional land or natural habitats such as rainforests, wetlands or grasslands, which is especially important in developing countries. This is noteworthy because on a global level the most direct threat to the environment from agricultural systems is the loss of natural habitats: the destruction of these habitats leads to decreased biodiversity and threatens the continued existence of certain plant and animal

Table 1: The benefits of biotechnology products

Biotechnology product	Benefits experienced
Disease-free planting material	• Improved growth and yield • Uniform harvest time and product quality • Small business opportunities
Disease diagnosis	• Rapid identification of pathogens • Cost effective • Appropriate for rural areas
Marker-assisted breeding	• Reduces the breeding timeframe by years • Reduces the volume of work and space required for breeding programmes • Cost effective
Herbicide-tolerant crops	• Encourages the use of environmentally friendly herbicides • Less soil erosion (enables no-till farming practices) • Less time expended • Better weed control • Improved yield, especially in resource-poor farming areas • Less crop damage • Less foreign matter in harvested seed • Lower input costs
Insect-tolerant crops	• Less chemical pesticides used, which benefits workers, consumers and the environment • Less impact on non-target organisms • Less management time needed • Lower chemical residues on product • Lower input costs • Lower fungal toxin levels, due to reduced insect damage • Significant yield, quality and financial benefits for small-scale farmers
Virus-tolerant crops	• Less chemical pesticides used • Rejuvenation of export market • Yield, quality and financial benefits for farmers
Pollen control/apomixes	• Control of breeding parameters • Time and effort saved • Cuts costs of breeding

Source: Kitch L., M. Koch & I. Sithole-Niang, Crop Biotechnology: A Working Paper for Administrators and Policy Makers in Sub-Saharan Africa. Harare: FAO Sub-Regional Office for Southern and Eastern Africa, 2002.

life.[5] As biotechnology provides pest-specific control, beneficial insects that assist in pest control will not be affected, facilitating the use of integrated pest

5 Sanvido O., M. Stark, J. Romeis & F. Bigler, 'Ecological impacts of genetically modified crops: Experiences from ten years of experimental field research and commercial cultivation.' *ISB (Information Systems for Biotechnology) news report.* Swiss Confederation, Federal Department of Economic Affairs, 2006.

management. In addition, herbicide-tolerant crops decrease soil erosion by permitting farmers to use conservation tillage.[6]

Pest and disease-resistant GM crops have significantly reduced the use of chemical pesticides; the accumulative reduction in pesticides for the period 1996–2004 was estimated at 172,500 metric tonnes of active ingredient, which is equivalent to a 14% reduction in the associated environmental impact of pesticide use on these crops. Insecticide use is reduced from 1–2 sprayings to nil, thereby virtually eliminating pesticide residues on maize that is eaten fresh.[7] GM crops have contributed to reducing greenhouse gas emissions through reduced fuel use (less spraying and soil cultivation) and GM herbicide-tolerant crops facilitate no/low till systems that result in less soil preparation and therefore additional soil carbon sequestration. Less fuel use translates into 400 million litres of fuel saved, which results in 1,082 million kg less carbon dioxide being released into the atmosphere. No/low till systems reduce the amount of carbon dioxide pumped into the atmosphere by 9,423 million kg. The combined effects of this are equivalent to removing 4.7 million cars, one-fifth of cars registered in the United Kingdom, from the road for one year.[8] Tillage has also been identified as one of the leading causes of soil erosion due to the loss of vital topsoil, but GM technology allows built-in weed control and therefore weed control through tillage is unnecessary and conservation tillage may occur, which leaves a layer of plant residues on the soil surface, preventing soil erosion, reducing evaporation and increasing the ability of the soil to absorb moisture.[9]

The potential risks to the environment and human health, which have been very well documented by those who oppose modern agricultural biotechnology, have not come to pass in the last decade of their use, one reason being that scientists and regulators have found ways to manage those risks. Indeed farmer, water and soil health have all improved due to the reduced pesticide usage required by GM varieties. GM cotton, for example, has allowed farmers to substantially lower their need for insecticides, which has had a favourable effect on reducing environmental pollution. This is also helpful in developing countries where expensive pesticides are not universally available and are also a threat to human health.[10]

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6 Pew Initiative on Food and Biotechnology, *op. cit.*

7 ISAAA (International Service for the Acquisition of Agri-biotech Applications), *Global Status of Commercialised GM and Biotech Crops*. ISAAA SEAsiaCentre, 2006.

8 Brookes G. & P. Barfoot, 'GM crops: The global economic and environmental impact – The first nine years 1996–2004', *AgBioForum*, 8, 2005, pp. 187–96.

9 Sanvido O. *et al., op. cit.*

10 Anderson K., E. Valenzuela & L. Jackson, *GM Cotton Adoption, Recent and Prospective: A Global CGE Analysis of Economic Impacts*. Washington, DC: World Bank.

Benefits for human health

Agricultural biotechnology may potentially increase the nutritional value of foods. For example, researchers in India recently announced the creation of a genetically modified potato in which protein content is increased by a third. The protein-enriched potato could improve nutritional deficiencies in the diets of the country's poorest populations. Other ideas that are being researched include increasing the iron content of rice and reducing phytic acid in corn, which interferes with the body's absorption of iron. Possibly the most notable development is the possibility of removing allergens from crops such as peanuts and wheat. An added bonus to developing nutritionally improved crops is that crops with a higher mineral content are naturally more resistant to infection and drought. It is a killing-two-birds-with-one-stone situation.[11] The concern that these nutritional changes may be harmful is addressed because nutritional assessments are an important part of the safety assessment of GM crops.

The development of 'golden rice' is an example of a nutritionally enhanced food created by agricultural biotechnology. According to the World Health Organisation (WHO), 250 million children worldwide are at risk from vitamin A deficiencies, and 10 million people face illness and death. Many of these will experience impaired vision, decreased immunity and protein malnutrition because vitamin A affects the absorption and use of amino acids. 'Golden rice' is genetically modified to produce beta-carotene, which serves as a source for vitamin A. Dr Ingo Potrykus at the Swiss Federal Institute of Technology and Dr Peter Beyer at the University of Freiburg have developed a strain of rice that produces beta-carotene in the grain itself. Due to the yellow hue that the beta-carotene gives the grains of rice, this modified rice has been dubbed 'golden rice'.[12]

An additional benefit from biotechnology, though not related to agriculture as such, is the possibility of producing vaccines and other pharmaceuticals more effectively in plants than employing the systems used at present. Producing plant-made vaccines can be done either by producing transgenic plants expressing the viral protein to be used as the vaccine or by cloning the gene into a systemically infecting virus, such as tobacco mosaic virus. The vaccine protein can be extracted from the plant and formulated into pills or capsules for oral ingestion.

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11 Pew Initiative on Food and Biotechnology, *op. cit.*

12 Thompson J.A., *op. cit.*

Food safety

All GM crop plants to be used as foods or as food products are required to undergo thorough and rigorous safety assessment before they become commercially available. International co-operation has occurred over the past 20 years to develop very strict food safety assessment procedures. Various aspects of GM crops and their characteristics are considered in detail by independent government experts to ensure that the foods derived from them are at least as safe as those derived from their conventional counterparts. Primarily, it must be determined whether or not GM crops are more toxic, allergenic or have significantly different nutritional characteristics. In order for a full assessment to occur, a great deal of information is required, which includes:

- the plant biology and its characteristics compared to the parental crop plant;
- the genetic modification and the resulting expression of the introduced protein;
- the safety of the introduced protein for human and animal health, including any potential toxicity;
- the potential allergenicity of the introduced protein;
- an assessment of unintended effects by consideration of composition, nutrition and general wholesomeness; and
- further assessments on animal feed safety and the environment when called for on a case-by-case basis.[13]

After extensive investigation, the consensus among many international institutions has been that GMOs pose no greater risks to food safety than crops derived by conventional methods. The international organisations that have come to this conclusion include the UN Food and Agriculture Organisation, the Organisation for Economic Co-operation and Development and the WHO. Before any GM food product can be released onto the market, it is extensively tested by experts to ensure its safety.

It may be of interest to note that if conventional crops were subjected to the same safety standards and tests as GM crops are, many of them would fail to meet the basic safety requirements.[14] Cassava is one of the most important food sources in tropical countries; however, the roots and leaves of poorly processed cassava plants contain a substance that, when eaten, can trigger the production

13 Keetch D., *Biotechnology: Food Safety and Nutrition*. Pretoria: AfricaBio, 2006.
14 Kitch L., M. Koch & I. Sithole-Niang, *op. cit.*

of cyanide,[15] and cyanide may also be found in the seeds of apples and cherry stones, and in the kernels inside the pits of apricots, nectarines, peaches and plums. The potato contains the poisonous glycoalkaloid solanine in all its parts, but mostly in the blossoms and fruit. Glycoalkaloid solanine content is extremely high when tubers are unripe or green as a result of incorrect storage and may even induce a coma in the case of high dosages. Castor beans may be very dangerous, and even one of them may be sufficient to cause death. They contain some of the strongest toxins of our planet's flora: the alkaloid ricinin and the toxalbumin ricin, the latter being more toxic even than strychnos and cyanides. Furthermore, these toxins have the ability to accumulate in the organism until the lethal dose is reached. However, 50–70% of castor bean seed content is a thick fatty oil, which contains vitamins A and D, and is used to make castor oil.[16] It is well known and documented that peanuts may be lethal to those allergic to them. Approximately 150 children die each year in America of peanut allergies. Some proteins produced in peanuts are the cause of this severe allergic reaction.[17] As noted above in section 2.1, biotechnology has the potential to remove these allergenic proteins and therefore make this possibly lethal food source safe for all.

There is no evidence to suggest that genetic modification reduces the nutritional value of food. To assess this, regulators usually evaluate the major constituents of the food (fat, protein, carbohydrate, fibre, ash and moisture), as well as the key nutrients (amino acids, vitamins, minerals, fatty acids). This approach enables both the intentional effects and any unintentional compositional changes in the food to be assessed, with the result that if negative unintentional effects or changes in nutrition are discovered, the product will be discarded. In South Africa, if positive unintentional effects or changes in nutrition are discovered, the product will be reviewed under the GMO Act and, if approved, may be commercialised with relevant labelling.

The use of the comparative concept of substantial equivalence indicates that GM foods can be assessed to a large extent by comparison with commonly consumed foods already regarded as safe. This allows the safety assessment to focus on any significant differences between the GM food and its conventionally produced counterpart. The comparative approach allows for an evaluation of the

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15 Ohio State University, *Researchers Get to the Root of Cassava's Cyanide-producing Abilities*, 2003, available at http://researchnews.osu.edu/archive/cassava.htm.

16 Oracle Think Quest, *Poisonous Plants and Animals*, 2000, available at http://library.thinkquest.org/C007974/1_1pot.htm.

17 McDowell J., *When Peanuts Are Poison: With One of the Most Dangerous Food Allergies, Many People Live in Constant Fear of Accidental Ingestion*, 2000, available at http://pubs.acs.org/subscribe/journals/mdd/v05/i05/html/05health.html.

important constituents of a new food in a systematic manner, while recognising that there is general acceptance that normally consumed food produced by conventional methods is regarded by the community as safe. It is important to note that, although a GM food may be found to be different in composition to the traditional food, this in itself does not necessarily mean that the food is unsafe or nutritionally inadequate. Each food needs to be evaluated on an individual basis. Substantial equivalence refers to only one aspect of the safety assessment of new foods, including GM foods. The concept is not used to come to a final decision for approval of a food, but is used to identify similarities and differences between the GM food and a comparator that has a history of safe food use.[18]

Socio-economic and livelihood benefits

The economic benefits of agricultural biotechnology are substantial. A recent paper by Brookes and Barfoot[19] summarised the overall global impact of transgenic technology and found that the cumulative total of net economic benefits at the farm level from 1996–2004 amounted to $27 billion, while the accumulative economic benefits during the nine years to developing countries ($15 billion) exceeded benefits to industrial countries ($12 billion). In 2004, 90% of the 8.25 million farmers benefiting from agricultural biotechnology crops were resource-poor farmers planting Bt cotton,[20] whose increased incomes have contributed to the alleviation of poverty. GM crops have helped to increase the income of 7.7 million subsistence farmers in 11 developing countries and contributed to lifting them out of poverty.[21]

In 2006 the estimated GM crop market was worth $5.5 billion. China has projected potential gains of $5 billion in 2010, $1 billion from Bt cotton and $4 billion from Bt rice, which is expected to be approved in the near future. Argentina increased farm income by $10.1 billion between 1996 and 2004 through growing GM crops, and South Africa has increased farm income by $56 million between 1998 and 2004. The global net economic benefit to farmers of GM crops in 2004 was $6.5 billion.[22] A World Bank study done on GM Bt cotton showed that

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18 Keetch D., *op. cit.*

19 Brookes G. & P. Barfoot, *op. cit.*

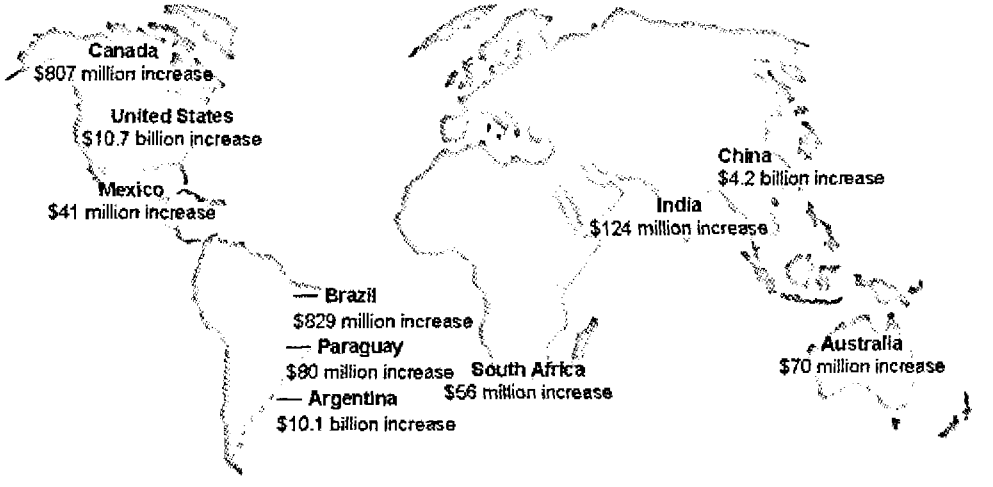
20 Bt (*bacillus thuringiensis*) is a bacterium that is present naturally in the soil worldwide. A unique feature of this bacterium is its production of crystal-like proteins that selectively kill specific groups of insects.

21 ISAAA, *op. cit.*

22 *Ibid.*

'developing country welfare could be enhanced more by allowing GM cotton adoption than by the removal of all cotton subsidies and tariffs.'[23]

Figure 5: Farm income gains in selected countries, 1996–2004



Source: Brookes G & P Barfoot, op. cit.

Agricultural biotechnology has the potential to lift farmers out of poverty and make countries more productive and therefore more economically competitive, as well as self-sufficient. The trickle-down effects of increased agricultural income are enormous and too numerous to fully examine here; it will simply be noted that the path to development relies heavily on economic development, and agricultural biotechnology is potentially pivotal to this.

Benefits in South Africa

In the Makhathini Flats in South Africa, a study was carried out on the benefits of GM cotton, specifically Bt cotton.[24] The results of the study show that 88% of respondents noticed a reduction in insecticide-related health problems since using Bt cotton, and a similar number reported a higher income from Bt compared to non-Bt varieties as a result of higher yields. This increased income was used for various purposes that enabled the further development of the

23 Anderson K., E. Valenzuela & L. Jackson, *op. cit.*

24 Ismael Y., 'Economic benefits of GM crops.' Presentation at the AfricaBio Workshop on the Latest Developments and Trends in Agricultural Biotechnology, 5–6 October 2006.

small-scale farmers' households. Most households (76%) used the income for the further education of their children, 46% re-invested it in growing cotton, 20% invested it in other crops and 28% used it to repay debts. Most used the time saved in spraying Bt cotton on other farm activities or to spend time with their families. Nearly 90% of respondents had increased their asset base due to Bt cotton, primarily by increasing their cultivable land. Therefore, overall, these small-scale farmers were able to develop themselves and their families, increase their crop varieties and emancipate themselves from the burden of debt, thus Bt cotton provided an improvement in the livelihoods of these farmers, and it is notable that these benefits are not limited by gender or farm size.

In Mpumalanga Province a maize study was carried out that compared growers of Bt white maize and herbicide-tolerant (HT) white maize with growers of some five different non-GM maize varieties.[25] The results of the study showed that Bt and HT maize had much higher yields and revenues than non-GM varieties, as well as lower input costs. As a result, the gross margins for Bt and HT maize were much higher than those of non-GM crops, with Bt weighing in at between 226–303% more and HT at 178–316%. The absolute income benefit from growing GM varieties compared to non-GM crops was R684.00 to 827 ha for Bt maize and R539.00 to 864 ha for HT maize, and since the average wage for labour in South Africa is R10–R15 per day, the financial gains per farmer planting GM varieties is equivalent to two to three months paid labour. Another benefit of Bt and HT maize was that storage life of these varieties is greater than that of non-GM varieties. These income and storage benefits translate directly into economic benefits for small-scale farmers and therefore contribute to an overall reduction in poverty and hunger in rural South Africa.

Consumer issues

Consumers have the right to know what they are consuming. They have the right to be informed about agricultural biotechnology so as to make informed decisions regarding it. No extensive surveys have been carried out in African countries on these issues, except in South Africa. In this regard, it is useful to note that a 2004 AfricaBio survey carried out in South Africa found that more consumers support the use of agricultural biotechnology for the production of GM foods than those who oppose it, and a large number of consumers felt that

25 Morse S., R. Bennett & Y. Ismael, 'Impacts of GM cotton and maize on household livelihoods in South Africa.' ESRC Centre for Social and Economic Research on Innovation in Genomics, University of Edinburgh and the Open University, 2006.

Figure 6: Bt maize plants grown by small-scale farmers in South Africa

Source: Mdutshane A., 'The impact of Bt maize: A small-scale farmer's experience.' AfricaBio presentation, April 2006.

Figure 7: GM maize grown on a small plot in Soweto

Source: Webster J., 'How do we keep feeding Africa?' Presentation at a Bio2Biz Workshop, 2006.

Figure 8: Comparison of yield from Bt and non-Bt maize plots

Pankop, 6 November 2006 Soweto 2006.
Source: Webster J., op. cit.

agricultural biotechnology would improve their quality of life, while others mentioned benefits to the environment and health, and reduced pesticide usage. In Gauteng and Cape Town, 58% and 56% of respondents, respectively, considered GM foods to be just as safe as conventional foods, and in Gauteng, the percentage of consumers that consider GM foods safe increased by 28% since 2001.[26]

In a recent survey carried out by Synovate, the market research arm of Aegis Group plc, on GM Foods and public opinion, 62% of South Africans who are familiar with GM foods are accepting of the technology, as long as it makes food taste better.[27] Synovate surveyed 3,127 respondents in Greece, Indonesia, Poland, Singapore and South Africa.

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26 AfricaBio, *Consumer Survey*. Pretoria: AfricaBio, 2004.

27 Synovate, *GM Foods: Delight or Fright?*, 2006, available at http://www.synovate.com/current/news/article/2006/08/gm-foods-8211-delight-or-fright.html.

Other findings of the survey include the following:

- Eighty-four per cent of Greeks and a majority of respondents in South Africa and Poland are familiar with GM foods, while 92% of Indonesians and 65% of Singaporeans are not familiar with them.
- Among the consumers who are aware of GM foods, 89% of those from Greece, 68% from Poland, 59% from Singapore, 66% from Indonesia and 33% from South Africa believe they may be harmful.
- Despite these cautious feelings, 46% of Indonesians, 45% of South Africans and 42% of Poles and Singaporeans believe that the benefits of GM foods outweigh the risks.

These consumer perspectives demonstrate the need for governments to take potential risks associated with the adoption of GM crops and food seriously. These risks are addressed below.

Potential risks of agricultural biotechnology

All new technologies come as a package deal with associated risks included. These new technologies require monitoring to ensure that the benefits are not lost because of unfounded fears based on hypothetical risks. Therefore, national governments have implemented strict and comprehensive procedures and frameworks to assess the potential risks of agricultural biotechnology. Consequently, once a biotechnology product is approved for trials and commercialisation, the end user may be assured it has been thoroughly risk-assessed and found to be safe.

Potential environmental risks

Decreasing biodiversity: Improving crop varieties may reduce the need for landraces[28] and negatively impact on agricultural biodiversity. Improved crop varieties may also make previously uncultivated land arable and therefore decrease the natural biodiversity in the area. Agricultural biotechnology, therefore, needs to aim at increasing the overall productivity of existing

28 Landraces are highly adapted to specific locales or groups, and refer to the particular kinds of old seed strains and varieties that are farmer-selected in areas where local subsistence agriculture has long prevailed. The bulk of genetic diversity in domesticated species is located in traditional varieties maintained by traditional farming systems, and these are landraces. Landraces are a variety with a high capacity to tolerate biotic and abiotic stress, resulting in yield stability and an intermediate yield level under a low-input agricultural system; see http://www.springerlink.com/content/ww62867127966m0w/.

agricultural land in order to contribute to biodiversity conservation. Agricultural biotechnology enables the preservation of biodiversity by allowing the isolation and transfer of valuable genes. This concern, while valid, is universal rather than applicable specifically to GM crops, as breeding conventional crop varieties may prove to be just as threatening to biodiversity, but without the technological capacity to conserve that GM allows.[29]

Invasiveness: Another associated risk is that hardy, GM-improved crops may make it impossible for conventional plants to compete with them, and the GM varieties may become invasive. However, to date there is no evidence that gene transfer makes plants more invasive, though gene transfer from plants with known invasive tendencies would certainly pose a higher risk. In 2001 a study done by Crawley *et al* focused on the long-term performance of GM crops in a natural habitat. The study was carried out over 10 years and 'in no case were the genetically modified plants found to be more invasive or more persistent than their conventional counterparts.'[30]

Gene flow: This refers to the unintended movement of genes from GM crops into wild relatives or organic crops, thus threatening their status as GM-free organic crops. This can only occur with wild relatives if the GM pollen can spread and fertilise a wild species to produce a hybrid. GM crops in South Africa do not have wild relatives with which they can cross, but it is possible that cross-pollination may occur with organic crops of the same variety.

Non-target organisms: GM crops are engineered to be resistant to certain pests, but there is concern that this built-in resistance may negatively affect non-target species. However, built-in genetic resistance, such as Bt, is harmful only to the specific target pest that feeds on the plant. A related concern is that target pests may develop a certain amount of immunity to GM resistance. However, the case of Bt suggests that this is unlikely, since Bt has been used as a spray-on insecticide for crops for over 40 years, and no pest resistance has developed.[31] Obviously, constant monitoring must be kept up to ensure this remains the case; however, Bt crops are becoming increasingly target-specific and even after many years of Bt crop cultivation, Bt toxins are not building up in the soil and affecting soil organisms, such as earthworms, collembola, mites, woodlice or nematodes.

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29 Amman K., 'The impact of agricultural biotechnology on biodiversity: A review.' University of Bern, 2004, available at http://www.botanischergarten.ch/Biotech-Biodiv/Report-Biodiv-Biotech12.pdf.

30 Crawley M.J., S.L. Brown, R.S. Hails, D.D. Kohn & M. Rees, 'Transgenic crops in natural habitats', *MacMillan Magazines*, 409, 8 February 2001.

31 Pew Initiative on Food and Biotechnology, *op. cit.*

Finally it must be noted that Bt crops have less impact on non-target insects than conventional insecticides do.[32]

Potential human health risks

The primary concern raised with regard to human health is that of allergenicity and toxicity. It is possible that a protein produced by a gene introduced to a plant may cause an allergic reaction, especially if the protein was not previously in that crop variety or even in the traditional food supply. Similarly, a new gene may also produce or exacerbate a toxin in that plant. It is also of concern that gene transfer may reduce the nutritional value of a plant. However, there is no evidence to date that GM foods cause allergic reactions any more so than conventional crops, and, overall, no harm has resulted from consuming GM crops worldwide. GM crops for human consumption have been closely monitored to assure their safety.[33]

As mentioned above, people have the right to know that they are consuming GM crops and what that might involve. Vegetarians may need to know if the food they are eating contains animal genes, and those who are opposed to GM technology for whatever reasons have the right to know which foods are GM so as to make an informed decision. In South Africa it is mandatory to label GM food products that contain animal or fish genes so that vegetarians will have a choice.

Intellectual property issues

The technology involved in GM crops is developed and patented by multi-national corporations. The concern is that this will adversely affect small-scale farmers by indebting them to these companies and forcing them to buy their seed from them annually. Developing agricultural biotechnology is a costly exercise, and therefore these corporations do have the right to protect what they have invested in, and this brings to the fore the question of intellectual property rights. Importing countries need to implement legislation regarding such rights that strikes an appropriate balance between protecting innovators, through granting an effective monopoly over their inventions, and social considerations, such as the possibility that indigenous communities will pay for technology that

32 Sanvido O. *et al., op. cit.*

33 Royal Society, *Genetically Modified Plants for Food Use and Human Health: An Update.* London: Royal Society, 2002.

is developed from their own indigenous resources, in a process termed 'biopiracy'. Of course, this debate is by no means confined to the GM industry and is a perennial source of contention in the WTO and the World Intellectual Property Organisation, among other international bodies.

Safety assessments of GM products[34]

To combat the above potential risks and fears associated with GM technology, comprehensive safety assessment procedures have been developed. The regulation process for GM foods varies from country to country, but is well regulated in countries that grow GM crops. Countries that have GM food safety legislation in place focus primarily on assessment of risks to consumers, animals and the environment. Some countries such as South Africa include socio-economic consideration in decision making, such as the impact on labour and trade-related implications. However, all countries that have commercialised GM crops have GM legislation and regulations in place, and all commercially available GM crops have passed the safety assessment and approval process through various regulatory bodies around the world.

Factors governing decisions about the release and use of GMOs

Applications for food safety approval of GMOs require data to support answers to a range of safety questions. These questions cover the following topics: a description of the genetic modification that is to occur, general safety issues, toxicological issues and nutritional issues. Regulators may at any time raise additional questions related to specific GM events.[35] Only when the data assessments have been reviewed and found to be acceptable will approval be given for food use of GMOs. The safety assessment of GM foods generally investigates:

- direct health effects (toxicity);
- tendencies to provoke allergic reaction (allergenicity);
- specific components that might have nutritional or toxic properties;
- the stability of the inserted gene;

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34 AfricaBio, *Biotechnology: Biosafety, Food Safety and Food Aid*. Pretoria: AfricaBio, 2006.

35 'GM event' refers to each instance of a genetically engineered organism. For example, the same gene inserted into a given plant genome at two different locations (ie. loci) along that plant's DNA would be considered two different 'events'. Alternatively, two different genes inserted into the same locus of two same-species plants would also be considered two different 'events'; see http://biotechterms.org/index.html.

- nutritional effects associated with genetic modification; and
- any unintended effects that could result from the gene insertion.

GLOBAL STATUS OF AGRICULTURAL BIOTECHNOLOGY IN 2005

The International Service for the Acquisition of Agri-biotech Applications (ISAAA)[36] publishes an annual report entitled *Global Status of Commercialised Biotech/GM Crops*. The 2005 report published the following findings:

- The year 2005 marked the 10th anniversary of the commercialisation of GM crops. In 2005, the global GM crop area continued to soar as the billionth acre, equivalent to the 400 millionth hectare of a GM crop, was planted by one of 8.5 million farmers, in one of 21 countries. This unprecedented high adoption rate reflects the trust and confidence of millions of farmers in crop agricultural biotechnology.
- Portugal and France resumed the planting of Bt maize in 2005 after a gap of five and four years, respectively, while the Czech Republic planted Bt maize for the first time in 2005, bringing the total number of EU countries now commercialising modest areas of Bt maize to five.
- In 2005, the US, followed by Argentina, Brazil, Canada and China, continued to be the principal adopters of biotechnological crops globally, with 49.8 million hectares planted in the US (55% of global GM crop area), of which approximately 20% included stacked products containing two or three genes, with the first triple-gene product making its debut in maize in the US in 2005.
- The largest increase in any country in 2005 was in Brazil, provisionally estimated at 4.4 million hectares, followed by the US (2.2 million hectares), Argentina (0.9 million hectares) and India (0.8 million hectares).
- GM soybean continued to be the principal GM crop in 2005, occupying 54.4 million hectares (60% of global GM crop area), followed by maize (21.2 million hectares at 24%), cotton (9.8 million hectares at 11%) and canola (4.6 million hectares at 5% of global biotech crop area).
- There is cause for cautious optimism that the stellar growth in GM crops, witnessed in the first decade of commercialisation (1996–2005) will continue and probably be surpassed in the second decade (2006–15). Adherence to good farming practices with GM crops will remain as critical as it has been during the first decade, and continued responsible stewardship must be practised,

36 ISAAA, *op. cit.*

particularly by the countries of the South, which will be the major deployers of GM crops in the coming decade.

The following sections examine agricultural biotechnology in various regions of the world, looking specifically at example countries in each region. These countries are relevant to the subject matter, but are by no means the only or final examples of countries that have embraced agricultural biotechnology.

Agricultural biotechnology in the developing world

Agricultural biotechnology in Africa[37]

Of the 11 developing countries that have already approved and adopted agricultural biotechnology crops to meet their own food, feed and fibre needs and/or to optimise exports, there are five lead countries that are expected to exert leadership and have a significant impact on future adoption and acceptance of agricultural biotechnology crops globally, because of their significant role in agricultural biotechnology crops and generally in world affairs. These five countries are China and India in Asia, Brazil and Argentina in Latin America, and South Africa in Africa. Collectively, they planted approximately 26 million hectares of agricultural biotechnology crops in 2004 to meet the needs of their combined populations of 2.6 billion (approximately 40% of the global population), which generated an aggregated agricultural gross domestic product (GDP) of almost $370 billion and provided a livelihood for 1.3 billion of their people. It is increasingly clear that other African countries besides South Africa are developing agricultural biotechnology to address food, feed and fibre production. A few of these countries and their activities are highlighted below.

Egypt

In 1990 Egypt established the National Agricultural Genetic Engineering Laboratory, and in 1992 this became AGERI (Agricultural Genetic Engineering Research Institute). AGERI aims to develop molecular biotechnology in Egypt. Decrees have been issued on protocols for testing and the safe handling of GMOs, for commercialisation and for the establishment of Egypt's National Biosafety Committee.

Egypt has been building human capacity and developing infrastructure for agricultural biotechnology through the Ministry of Agriculture and various

37 Source: AfricaBio, *Biotechnology Pocketbook*. Pretoria: AfricaBio, 2006.

universities and research centres. An accredited laboratory for food and feed safety assessment for GMOs has been established, and Egypt is working on increasing the number of reference laboratories in the area of biosafety.

Egypt suffers from a lack of dynamic private sector initiative and an effectively implemented biosafety framework to take technologies to the farmer. These gaps need to be addressed, because 30% of the GDP is agriculture and 30% of the population work in this or a related field. Capacity building is also occurring through a UN Environmental Programme Global Environmental Facility (UNEP-GEF) Pilot Biosafety Enabling Activity Project. Since 2000 the Egyptian National Academy for Science and Technology has had a strategy for genetic engineering and biotechnology, has funded over 600 research proposals in this area and plans to fund six centres of excellence. Research and development in Egypt includes genome mapping of several crops, including tomato, date, palm, rapeseed and wheat. GMOs developed are Bt maize, Giza bollgards II cotton, tomato resistant to yellow leaf curl virus, and zucchini yellow mosaic virus-resistant cucurbitacea. Currently, field studies are being conducted on cucumber, maize, melon, insect-resistant potato, cantaloupe, virus-resistant squash, sugar cane, tomato and wheat. GM potato and squash are ready for commercialisation. Current laboratory trials involve banana, barley, cotton and faba bean. Bt cotton has reached the level of field trials and in the next 2–3 years drought-resistant wheat will be ready for commercialisation. Virus-resistant canola has already been commercialised.

Egypt ratified the Cartagena Biosafety Protocol on 23 December 2003 and implemented it on 21 March 2004. The Ministry of Environment is the focal point for implementation and is also the competent authority. A draft biosafety law is being negotiated.

Public awareness in Egypt is vital because the Egyptian consumer is fearful of GM crops. Public awareness initiatives include the Egyptian Biotechnology Information Centre (EBIC), established in 1993 by ISAAA, the Agricultural Research Council and AGERI. EBIC targets journalists, scientists, decision makers, children and youth, and is planning to work with farmers in future and a wider range of media, especially television. The first Arabic website for agricultural biotechnology has been launched, and a monthly Arabic newsletter has been published, as well as an electronic English newsletter. Workshops have been held including the Seeing Is Believing Programme, which consisted of two visits to South Africa. Regional activities include the Biotech in Islamic Countries workshop, the Bt cotton workshop, and visits to Lebanon and Jordan.

Kenya

Currently Kenya is regarded as a food-deficient country that depends heavily on food imports, especially rice and wheat. The production of these crops can be boosted by modern biotechnology.

The Government of Kenya considers biotechnology to be a crucial tool for development, and the minister of agriculture embraces GM crops. At the same time, the government underlines the need to put an adequate biosafety framework in place to ensure that Kenya can enjoy the full benefits from this technology. Kenya has signed the Cartagena Protocol and ratified it on 24 January 2002.

Kenya is in a difficult position because it relies on World Food Programme food donations (primarily US donations that include GM crops), while most Kenyan agricultural exports are to the EU countries, which are reluctant to embrace GM crops and their products. However, this situation may change in light of the recent WTO ruling that the EU must lift its *de facto* moratorium on GM crops.

The Kenyan Agricultural Research Institute accounts for more than half of the total expenditure on agricultural research. Kenya is conducting field trials on Bt maize, Bt cotton, virus-resistant sweet potato and cassava. The National Biotechnology Committee approved the application for Bt cotton in 2003.

While there is a good public awareness of GM crops in Kenya, real knowledge and understanding of them are still low. Perceptions are mixed and much work is still required. Public awareness and capacity-building initiatives include the GMO Guidelines Workshop (November 2002), the UNEP-GEF Pilot Biosafety Enabling Activity Project and the UNEP-GEF Project on Implementation of National Biosafety Frameworks, as well as many workshops and information sessions carried out by organisations such as the African Biotechnology Stakeholders Forum, ISAAA – Kenya, African Harvest and the African Seed Trade Association.

South Africa

The South African government ran an interim biosafety assessment and decision-making process from 1990 to 1999 that led to the establishment of the Genetically Modified Organisms (GMO) Act No. 15 of 1997. Controlled field trials with GMOs began in 1990 and resulted in the 1997 issuance of the first conditional commercial release permit by the Department of Agriculture. The first GM crop tested was Bt cotton in 1990, and Bt cotton was the first crop to be commercially released. The present national cotton crop is over 85% GM.

GM maize was approved for commercial release in 1998, and the first application comprised some six yellow maize hybrids, while GM soybeans were approved in 2000 and the present crop is about 50% GM.

South Africa has reviewed over 200 applications for GMO trials in the last 14 years and has approved five GM crops for commercial release. The country has also approved the import of GM maize, soya and canola from the US, Canada and Argentina subject to strict phytosanitary conditions.

Table 2: The area in South Africa planted with GM crops in 2005–06

Crop	Hectares	% of total crop
White maize	85,500	9
Yellow maize	195,000	26
Soybean	150,000	65
Cotton	30,000	85

South Africa developed a National Agricultural Biotechnology Strategy in 2003. The strategy goes a long way toward removing the uncertainties that have existed in South Africa, and which have delayed local and foreign investment in agricultural biotechnology. The strategy identifies the need to develop at least three Agricultural Biotechnology Regional Innovation Centres to facilitate commercialisation and develop agricultural biotechnology companies in South Africa. South Africa has signed and ratified the Cartagena Protocol. The primary responsibility for implementing the Protocol has shifted from the Department of Environmental Affairs and Tourism to the Department of Agriculture, which has modified the GMO Act to comply with the Protocol.

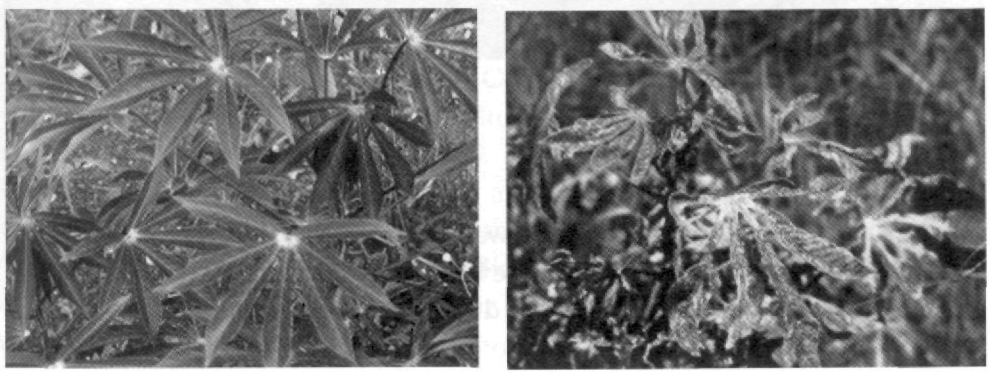
Figures 9 and 10 show examples of crop research projects currently being undertaken in South Africa. The images explicitly provide evidence of the benefits of agricultural biotechnology.[38]

38 Webster J., *The Status of Biotechnology and Biosafety in Africa*. Egypt: AfricaBio, 2006.

Figure 9: Unhealthy and healthy maize plants

These maize samples were intentionally sprayed with the maize-streak virus. The conventional variety (left hand side) was unable to grow and died thereafter. However, the GM variety (right hand side) made use of the maize-streak virus coat protein gene, which conferred resistance to the plant and therefore enabled it to continue growing successfully.

Figure 10: Healthy GM cassava and Virus-infected non-GM cassava



The following are the advantages of Bt cotton over non-Bt cotton:

Figure 11: Bt and non-Bt cotton

BT cotton	Non-Bt cotton
Small, compact plant	Large and excessive growth
Many mature bolls ready for harvest	Difficult to spray
Less than three sprays for non-bollworm pests	Few bolls to harvest Ten sprays for all insect pests

Bt cotton *Non-Bt cotton*

Zimbabwe

The biosafety regulatory framework was initiated in the early 1990s, and in order to establish a Biosafety Board, the Research Council of Zimbabwe needed to enact a law that could empower it to do so. To accomplish this, a decision was made that the existing Research Act of 1986 would be amended in order to include terminology that could cover this aspect. The Research Act of 1986 was finally amended in 1998 after six years of consultation. The Research Act

governs biotechnology research and biosafety in Zimbabwe. It falls under the Research Council of Zimbabwe, which reports to the Minister of Science and Technology in the Office of the President and Cabinet. It must be noted that this document became available before the Cartagena Protocol was passed in January 2000. Consequently, issues relating to trans-boundary movement, packaging, labelling, liability and redress, advance informed agreement, notification and the biosafety clearing house mechanism were not adequately addressed. With funding from UNEP-GEF, the Biosafety Board therefore developed the National Biotechnology Authority Bill 2006, which seeks to establish a body responsible for managing the import, research, development and production of biotechnology in Zimbabwe. The minister of science and technology development, Dr Olivia Muchena, said biotechnology had the potential to greatly contribute to economic development, particularly in the agricultural and health sectors. The law seeks to ensure that biotechnology activities do not come with adverse effects on health, the environment, the economy, national security, and social norms and values. Under the bill, a National Biotechnology Fund will be established to promote the marketing and production of transgenics, in addition to stimulating demand for research into modern biotechnology. The fund would consist mainly of levies, and the minister of science and technology development, for the benefit of the fund, would be empowered to impose these levies on producers, processors or buyers of any product of biotechnology. Zimbabwe has signed the Cartagena Protocol and ratified it on 25 February 2005.

Zimbabwe has done some research in agriculture and animal diseases, and has developed mechanisms for testing for genetic modification and biotechnology. An M.Sc course in biotechnology is offered at the University of Zimbabwe.

SADC

The Southern African Development Community member states have no harmonised regional position on agricultural biotechnology and biosafety, and, in particular, on the handling of GMOs. To remedy this gap in legislation, the SADC Council of Ministers directed all member states to enact national legislation by 2004 in harmony with the Cartagena Protocol and the draft African Union African Model Law on Biosafety. At present, only South Africa and Zimbabwe have implemented their legislation on GMOs, while Malawi, Mauritius and Tanzania recently approved legislation on GMOs. To further the development of harmonised legislation, SADC established an Advisory Committee on Agricultural Biotechnology and Biosafety, which is responsible

for developing national and regional capacity building, as well as for assisting member states with developing national polices and regulations on agricultural biotechnology.

Related to the development of regulations is the need to implement measures to constantly monitor the safety of GM products. Four SADC countries have legal mechanisms for biosafety review of the development and application of GMOs: South Africa, Zimbabwe, Malawi and Mauritius. Most of the SADC member states are signatories to the Cartagena Protocol. The status of biosafety development in African countries is shown in Table 3.

Table 3: The status of biosafety development in African countries

Signed onto UNEP-GEF biosafety framework *development project (will accede to the* Cartagena Protocol)	Algeria, Benin, Botswana, Burkina Faso, Burundi, Central African Republic, Comoros, Congo, DRC, Djibouti, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Ivory Coast, Lesotho, Liberia, Libyan Arab Jamahiriya, Madagascar, Mali, Morocco, Mozambique, Niger, Nigeria, Rwanda, Senegal, Seychelles, Sierra Leone, South Africa, Sudan, Swaziland, Togo, Zimbabwe
Countries that have ratified the Cartagena Protocol	Algeria, Botswana, Burkina Faso, Cameroon, DRC, Djibouti, Egypt, Eritrea, Ethiopia, Gambia, Ghana, Kenya, Lesotho, Madagascar, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Oman, Senegal, Seychelles, South Africa, Sudan, Swaziland, Togo, Uganda, Zambia, Zimbabwe
Have biosafety guidelines	Tunisia, Morocco, Mauritania, Burkina Faso
Have draft legislation	Kenya, Namibia, Nigeria, Uganda, Zambia
Have legislation, but frameworks not yet functioning	Cameroon, Malawi, Mauritius
Have functioning GM legislation	Egypt, South Africa, Zimbabwe

Source: AfricaBio, Communicators Manual. Pretoria: AfricaBio, 2006

Agricultural biotechnology in other developing countries

At present, of the 70% of global GM cotton planted in countries of the South, three Asian countries dominate: India, China and Pakistan. Their GM cotton crops together constitute 50% of global cotton production. In 2005 Argentina grew 20% of the worlds GM crops and Brazil grew 10%. Iran and China are the most advanced countries regarding the development of GM rice; China has field tested GM rice and should commercialise it soon.

A recent survey of China's plant biotechnologists shows that China is developing the largest plant agricultural biotechnology capacity outside of

North America, with about 150 laboratories in more than 50 research institutes and universities working on agricultural biotechnology. The list of GM crops in trials is impressive and differs from those being worked on in other countries. GM varieties for four crops have been approved for commercialisation in China since 1997.

Argentina increased its adoption rate of GM maize to 65% in 2005, from 55% in 2004. In 2005 Brazil overtook Canada to have the third-largest hectarage of GM crops in the world, with 9.4 million hectares. Paraguay increased its adoption rate of GM soybean by 50% in 2005, and 85% of its national soybean crop is now GM. However, it is India that boasts the largest proportional year-on-year growth in biotechnological crop hectarage: between 2003 and 2004 hectarage of Bt cotton hybrids increased 400%, and by a further 160% in 2004–05. Mexico increased GM cotton hectarage by nearly 100% in 2005.

The adoption of GM Bt cotton in the two most populous countries in the world – India and China – should greatly influence the approval, adoption and acceptance of biotechnology crops in countries throughout the world.[39]

Agricultural biotechnology in the developed world[40]

The US

The US has set priorities, established policies and agencies for research and development, and leads in the commercialisation of agricultural biotechnology. The US Department of Agriculture supports the development of new agricultural biotechnology applications to improve food production. The supportive agricultural biotechnology policy of the US has resulted in over 40 products being approved for human and animal consumption since 1995.

The US does not have different regulatory policies in place to govern biotechnological and conventional food products – both categories fall under the same legislation. This equal treatment is because these products are seen as being largely similar, and because there is no scientific basis for assuming that agricultural biotechnology food products are more risky or substantially different from other food products. Therefore, in this regard, GM-derived food in the US does not have to be labelled as such.

The US Department of Agriculture's National Agricultural Statistical Services[41]

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39 ISAAA, *op. cit.*

40 AfricaBio, *Situational Analysis of Modern Biotechnology*. Pretoria: AfricaBio, 2005.

41 US Department of Agriculture, Website, 2006, available at http://www.nass.usda.gov/.

recently released its 2006 plantings report. Once again, the area planted to GM crops is on the increase:

- *Soybeans*: In 2006, 89% of soybeans grown in the US were GM varieties, amounting to 26.99 million hectares. In 2005, 87% of US soybeans were GM varieties (25.4 million hectares).
- *Maize*: In 2006, 61% of maize grown in the US was GM varieties (19.6 million hectares). In 2005, 52% of US maize was GM varieties (17.2 million hectares).
- *Cotton*: In 2006, 83% of cotton grown in the US was GM varieties (5.13 million hectares). In 2005, 79% of US cotton was GM varieties (4.55 million hectares).

Canada

For two decades, the Canadian government has supported agricultural biotechnology as a priority. Canada has an agricultural biotechnology policy that is subject to ongoing renewal. This policy provides a positive basis from which Canada can establish itself as a responsible world leader in agricultural biotechnology, with agricultural biotechnology as one of its priorities. In September 2006 the Canadian Biotechnology Advisory Committee released a report entitled *'BioPromise? Biotechnology, Sustainable Development and* Canada's Future Economy',[42] which encourages the government to build a productive, safe and long-term relationship between biotechnology and sustainable development. Dr Arthur Hanson, chair of the Expert Working Party and an internationally renowned expert on sustainable development, said it may be possible by 2020 to have a flourishing rural economy that supplies one-quarter of Canada's fuel, chemical and synthetic product needs from renewable biomass sources and a 50% reduction in the use of harmful chemicals that accumulate in the environment and in people's bodies if biotechnology is harnessed.

The positive approach of the Canadian government's policy has resulted in approvals for agricultural biotechnology foods for human consumption, including varieties of maize, canola, potato, tomato, squash, soybean, flax and sugar.

The Canadian government conducts a safety assessment on all agricultural biotechnology-derived foods to demonstrate that the food is safe before it

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42 Canadian Board Advisory Committee, *BioPromise? Biotechnology, Sustainable Development and Canada's Future Economy*, 2006, available at http://cbac-cccb.ca/epic/internet/incbac-cccb.nsf/en/ah00605e.html.

is allowed into the Canadian market. Like the US, Canada does not have a mandatory labelling requirement for agricultural biotechnology products and supports labelling on a case-by-case basis.

CONCLUSION

While it is clear that the products of agricultural biotechnology have significantly benefited both the developed and the developing world, including South Africa, there continues to be controversy surrounding this technology at the national, regional and global levels, and this controversy has international trade implications that limit the full utilisation of agricultural biotechnology in Africa. In particular, the controversy is often used in such a way that it is in danger of creating artificial trade barriers. The response to this controversy and perceived risks has been to develop more comprehensive and restrictive legislation. It is well established that over-regulation of new technologies, due to perceived rather than real risks, can impede new and novel product development and introduction, which may be key to economic and development issues in Africa.

Chapter 3

Socio-Economic Implications of GMO Regulation in Africa: A Quest for a Pragmatic Approach

Durrel N Halleson[1]

INTRODUCTION

The debate on the safety or danger of biotechnology is filled with issues that are far beyond science and environmental activism. It is feared that the sensational manner in which this debate is carried on may adversely affect the capacity of countries to carry out programmes and policies that would help eradicate or alleviate hunger in their territories.

Sub-Saharan Africa, a region already affected heavily by the HIV/AIDS epidemic, civil wars, internal displacement, bad governance and dire poverty has more than half of the world's starving population.[2] Agriculture remains the most viable livelihood for the majority of Africans. However, it is a sector rife with hostile climatic conditions exacerbated by poor government policies. It is against this backdrop that biotechnology has been proposed as one of the possible solutions to the dire food insufficiency and poverty prevalent on the continent. This chapter examines the potential socio-economic implications of the positions Africa takes both at regional and international levels on biotechnology- and trade-related issues. It also focuses on the dynamics behind such positions, the safety concerns raised by the African Model Law on Biosafety and how such concerns could implicitly affect biotechnology uptake and trade.

THE AFRICAN MODEL LAW ON BIOSAFETY

Background

The African Model Law on Biosafety remains the most significant development in the area of GMO regulation in Africa. It was commissioned by the AU (then

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1 DURREL N. HALLESON was a Research Intern at SAIIA when this paper was written; and is currently a Researcher/Project Officer at the Centre for Environment and Development (CED), an NGO in Cameroon.

2 Ndiritu C.G., 'Biotechnology in Africa: Why the controversy?', available at http://www.cgiar.org/biotech/rep0100/Ndiritu.pdf.

the Organisation of African Unity) in June 1999 to respond to the growing controversy and challenges regarding biotechnology and GMOs in Africa. It is also intended to be a basis upon which member states could develop their own biosafety legislations. The Model Law was prepared by a group of experts selected from across the continent and was finalised in May 2001 in Addis Ababa, Ethiopia. It was subsequently adopted at the 74th Ordinary Session of the African Council of Ministers in Lusaka, Zambia in July 2001.

The Model Law was a sort of response to the impasse in negotiations for the adoption of the Cartagena Protocol on Biosafety. It was intended to serve as a fallback document for African countries in the case where negotiations for the adoption of the Cartagena Protocol provided under the Convention on Biological Diversity (CBD) were deadlocked.[3] It could be argued that the eventual adoption of the Protocol in Montreal Canada in 2000 meant that the Model Law was irrelevant. However, African countries have continued to rely on the Model Law as an inspirational document for the drafting of their own national biosafety legislation.[4] Despite its broad coverage of some of the concerns of African countries, such as the need to protect the continent's biodiversity and agricultural practices through the application of the precautionary principle, it does not cover intellectual property rights, despite their crucial role in the GMO debate.

THE MODEL LAW, ITS CHARACTERISTICS AND ETHICAL (SOCIO-ECONOMIC) OUTLOOK

The Model Law is based on the same principles as the Cartagena Protocol, but is broader in scope than the Protocol. It focuses on the exigencies pertaining to Africa. Unlike the Protocol, it applies to all GMOs, including those intended for release into the environment, for pharmaceutical purposes and for feed or processing, as well as GM-derived products. The Protocol excludes from its scope most of these issues covered by the Model Law. For instance, the Protocol excludes from its coverage all products derived from GMOs and GMOs for pharmaceutical purposes. The drafters of the Model Law seem to believe that

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3 UN Conference on Environment and Development, Convention on Biological Diversity, 5 June 1992, UNEP/Bio.Div./CONF/L.2, available at http://www.biodiv.org, accessed 1 February 2006.

4 The Cameroon Biosafety Law enacted by the National Assembly in November 2003, according to the Cameroon Minister of Environment and Forestry, was strongly guided by the Cartagena Protocol and the African Model Law on Biosafety; see Bouato B.B. (ed.), 'Biotechnologies in Africa: The case of Cameroon', available at http://www.au-appo.org/fadenah/article.php3?id_article=11.

adopting such a holistic set of biosafety rules would help protect the continent's biodiversity, since Africa remains a critical genetic resources hub. The Model Law's central focus is more on the environmental and health safety concerns of biotechnology.

The development of the Model Law could be seen as an attempt to respond to the public attitude towards GM foods. According to Zidenga,[5] the distrust by Africans of what is perceived as externally imposed solutions has made them suspicious of biotechnology – particularly out of fear that it could entail corporate control of their agricultural system, which is traditionally seen as communally owned. The Model Law is not legally binding and it does not require any formal process by individual countries for its adoption. It is simply an attempt to facilitate the harmonisation of biosafety legislations across the continent. Yet despite its non-legally binding character, the Model Law remains a major informative text together with the Cartagena Protocol in guiding the drafting of some of the national biosafety and biotechnology laws in Africa.[6]

However, the Model Law adopts a narrower approach in dealing with biotechnology and biosafety within the broader socio-economic context. This approach could be criticised as unrepresentative of Africa's needs. In particular, its overemphasis of biosafety may have far-reaching negative impacts on the ability of Africa – with almost half of the world's hungry population – to harness food production through the use of biotechnology.

Consequently, the Model Law is seen in some quarters as representing the views of antagonists of biotechnology. Further, the whole process of the preparation and adoption of the law was reportedly flawed: it lacked transparency and was 'hi-jacked' by anti-GMO extremists.[7]

THE MODEL LAW AND ITS ESSENTIAL TRADE-RELATED PROVISIONS

The Model Law, just as the Cartagena Protocol, is keen to regulate the cross-boundary movement of biotechnology-engineered products. It therefore seeks to regulate all GM products intended for import and export, that are in transit,

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5 Zidenga T., 'The status of biosafety in Africa.' ISB news report, July 2003, available at http://www.isb.vt.edu.

6 Kameri-Mbote P., 'The development of biosafety regulation in Africa in the context of the Cartagena Protocol: Legal and administrative issues', *RECIEL*, 11, 1, 2002.

7 Prof James Ochanda, Chairman of the African Biotechnology Stakeholders Forum (ABSF), quoted in *Biosafety News*, 29, February 2002, available at http://www.biosaftynews.com/feb02/story1.htm, accessed 4 July 2006.

and that are intentionally or unintentionally released into the environment. The Model Law therefore applies to all GMOs, including those intended for release into the environment, pharmaceutical purposes, food, feed or processing, and derivates of GMOs.[8] Its broad application to all these activities remains uncertain, especially if one considers the fact that the Cartagena Protocol upon which it is based excludes some of these activities. For instance, the Protocol does not apply to trans-boundary movement of GM products that are to serve as pharmaceuticals for humans. According to the Protocol, these are already regulated by other international instruments.[9] However, the comprehensive coverage of these issues under the Model Law could be viewed in light of the view that the risks from GMOs are the same and there is no distinction in such risks, whether the GMOs are used for agriculture, medicine or research.[10]

The Model Law, like the Cartagena Protocol, explicitly provides for an Advanced Informed Agreement (AIA).[11] The AIA makes it incumbent upon any person who intends to transport, transit and carry out the contained use of or release of any GM product to inform the competent authority before doing so. However, the Model Law's AIA is different from that of the Cartagena Protocol, as it applies to all other subsequent transactions. The Cartagena Protocol requires an AIA only for the first intentional trans-boundary movement of GMOs.[12]

The AIA ties in with the Model Law's provision on risk assessment and risk management.[13] Just like the AIA in article 4 of the Model Law, the risk assessment provides for the possibility of any country of import or transit to require the importing party to conduct a risk assessment of the intended GM products. Based on the risk assessed, the importing party could allow or disallow the products to enter its territory. The risk management provision also prohibits import of and trade in GMOs if they contain characteristics or specific traits that pose unacceptable risks to the environment, biological diversity, human health, socio-economic conditions or cultural norms.[14]

The Model Law also provides for the identification and labelling of all GM products, specifying clearly the relevant traits and characteristics and providing for the possibility of tracing these traits. The labelling of the product needs to

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8 African Model Law, art. 2.
9 Cartagena Protocol, art. 5.
10 Mayet M., 'Why Africa should adopt the African Model Law on Safety in Biotechnology', available at http://www.biosafetyafrica.net/.
11 Model Law, art. 4.
12 Cartagena Protocol, art. 7(1).
13 *Ibid.*, arts. 8 & 9.
14 *Ibid.*, art. 9(3)(b).

specify that the product is GM-derived and whether it may cause allergies or pose other risks. The law therefore emphasises the possibility of potential consumers knowing whether the products are GM-derived or not.

THE MODEL LAW AND THE PRECAUTIONARY PRINCIPLE

Background to the precautionary principle

The African Model Law, just like other regulatory instruments on biotechnology and GMOs, has a precautionary principle as its strong tenet. It incorporates to a large extent the precautionary principle of the Cartagena Protocol. Some of the elements of the precautionary principle are given particular attention under the Model Law, such as the AIA, liability and redress, risk assessment and risk management.

A major feature of the precautionary principle is that it does not have a universally accepted definition. However, the principle generally provides that where there is scientific uncertainty regarding an issue that could have serious long-term effects, the lack of scientific certainty should not stop a country from adopting measures to prevent the potential risks from manifesting themselves.[15] This interpretation, especially as applied to the protection of the environment, was given a significant recognition by the United Nations Conference on Environment and Development in 1992.[16]

However, the practical application of the precautionary principle remains a controversial issue in international law. The US government, for instance, opposed its incorporation into both the CBD and the Cartagena Protocol, whereas the EU considers it to be a fundamental regulatory instrument for biotechnology. Accordingly, the precautionary principle is embedded in many EU directives and regulations adopted since the 1990s.

The relatively conservative approach of the EU is based on the contention that GM products are not the same as conventional products and must be governed by specific regulations.[17] However, the need to compete with the US in biotechnology has gradually caused the EU to rethink its precautionary approach to GMO

15 Bridgers M., 'Genetically modified organisms and the precautionary principle: How the GMO dispute before the WTO could decide the fate of the international GMO regulation', *Temple Environmental Law and Techology Journal*, 22, p. 171, 2004.

16 Principle 15 of the Rio Declaration explicitly provides that the precautionary principle shall be used to protect the environment by states. The CBD, adopted in 1992, also provides for the use of the precautionary principle, but changed its strict application by using the word 'should' from the 'shall' used in the Rio Declaration.

17 See EC Directive 90/220.

regulation. Its revision of European Commission Directive 90/220 in mid-July 2000 was replaced by a new regulatory framework, Regulation 2001/18, which was premised on the need to remain competitive in biotechnology with the US.[18] The precautionary principle, despite being highly contested and controversial, has been given some significant status in international law, especially within the multilateral trading system. The WTO has incorporated its application into some of its core agreements,[19] though subject to some limitations (this issue will be revisited later in the paper). It has also been considered in some of the trade disputes under the WTO Trade Dispute Settlement Body.[20]

The Model Law's incorporation of the precautionary principle

The incorporation of the precautionary principle into the Model Law is premised on the approach used by the EU in its regulation of GMOs and their derived products. The application of the principle generally entails risk analysis as to whether a product or activity is safe or free from risk. It is doubtful whether it entails a zero-risk analysis with regard to GMOs and biotechnology. The Cartagena Protocol, despite endorsing the application of the principle allowing parties to unilaterally reject GMOs where there is lack of scientific certainty, does not provide for what margin of risks could be allowed and leaves this to the competence of individual countries.[21]

The Model Law implicitly adopts a zero-risk-tolerance approach for GMOs and their derived products. It provides that there will be no approvals for release unless there is demonstrated evidence that the GMOs or derived products are

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18 Suppan S., 'The WTO agreements and the Biosafety Protocol: Prospects for reconciliation and implementation', in Schalatek L (ed.), *World Trade, Food and Agriculture: A Look at the World Trade Organization, Genetically Modified Organisms and the Issue of Food Security.* Washington, DC: Heinrich Böll Foundation, 2001, pp. 103–12.

19 WTO, Agreement on Sanitary and Phytosanitary Measures, 15 December 1993, GATT Doc. MTN/FA II-AIA-4, art. 5.7, available at http://www.wto.org/english/tratop_e/spsagr_e.htm, accessed 29 January 2006; and WTO, Agreement Establishing the World Trade Organization, Annex A: 'Multilateral Agreements on Trade in Goods – General Agreement on Tariffs and Trade 1994', art. XX, available at http://docsonline.wto.org/, accessed 29 January 2006.

20 In the EC Biotech case, the Panel argued that the application of the precautionary principle must be subjected to reasonable limits so as not to undermine the provisions of Annex C(1)(a) of the SPS Agreement; see CIEL (Centre for International Environmental Law), 'EC-Biotech: Overview and analysis of the panel's interim report', March 2006, available at file:///C:/Documents%20and%20Settings/User/My%20Documents/GMO%20II/GMO/ECBiotech_InterimReport_31Mar06.html.

21 Incorporating the principle as a key pillar, see Recital 4 of the Preamble, arts. 1, 10(6) and 11(8) of the Protocol.

free of any adverse risks to both the environment and human health.[22] The Model Law's approach can be compared to the EU's strict regulatory approach in approving GMOs to be released into the environment.[23] The EU, however, under article 12 of Regulation 1830/2003, provides instances where adventitious and technically unavoidable traces of authorised GMOs cannot be excluded. It therefore allows for a minimum threshold of 0.9% of unauthorised GM traits in products to be excluded from mandatory labelling. Such a strict approval system advocated by the Model Law could be interpreted to amount to a *de facto* moratorium on biotechnology in Africa. It has been argued that this approach may preclude Africa from deriving any benefits associated with biotechnology.[24]

However, the strict approach adopted by the Model Law should be seen in light of the imperative for Africa to protect its biodiversity. Nonetheless, it fails to strike a balance between the needs of meeting the continent's food problems and protecting its biodiversity. This could undermine any possibility of improving agriculture in Africa through the use of high-yielding seeds. If we consider the pressing problems of food insecurity, malnutrition and poverty endemic to the continent, then such a strict interpretive approach would not help the continent in its fight to ensure adequate food security, a problem that the Model Law intends to solve.

Africa's approach to biotechnology has been attributed more to the need to protect its trade relationship with the EU and other GMO-sensitive countries rather than its expressed views on human health and the environment.[25] Its negotiation positions at the talks leading up to the Cartagena Protocol could justify this, as the continent sided with the EU for the adoption of a strict regulatory agreement. The approach adopted by the EU and the Like Minded Group of countries (consisting of developing countries) was in stark contrast to the Miami Group. The latter group, comprising major agricultural-exporting and GMO-growing countries, wanted a more-simplified regulatory procedure for GMOs, especially those intended for food, feed and processing.[26]

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22 Model Law, art. 6(7).

23 See EC Regulation 178/2002.

24 AfricaBio submission on the OAU Model Law on Biosafety, available at http://www.africabio.com/policies/Submission%20OAU%20Model%20Law%20on%20Biosafety%20by%20AfricaBio.htm.

25 Nielsen C. & K. Anderson, 'GMOs, trade policy, and welfare in rich and poor countries.' *Draft World Bank workshop paper on standards, regulation and trade.* Washington, DC: World Bank, 27 April 2000.

26 Newell P. & R. Mackenzie, 'The 2000 Cartagena Protocol on Biosafety: Legal and political dimensions', *Globalisation and Poverty*, available at http://www.gapresearch.org/governance/GEC8.pdf.

The implications of the precautionary principle for Africa's uptake of GMOs

The precautionary principle allows for countries where there is insufficient evidence on the safety of GM products to put the release of such products on hold. However, the interpretation of the principle has been subject to inconsistencies. The marked divergences in interpretation of the principle between the EU and the US have been raised in some trade disputes. The Model Law's interpretation of the principle entails that in the absence of full scientific knowledge, scientific investigation should be instituted only after the principle has been evoked. This places the burden of proof on the importing party. Though such restrictive measures are justifiable under multilateral environmental agreements, under multilateral trade rules they may be considered as trade-restrictive or protectionist. This was one of the grounds for the institution of a WTO Dispute Panel by the US and other countries on the EU's *de facto* moratorium on GMOs.[27] For the complainants, the EU regulatory framework constituted a disguised trade measure and was not based on biosafety or health protection grounds.

The precautionary principle seeks to anticipate and, where possible, minimise the potential risks associated with biotechnology.[28] Though such arguments could be valid, the fact that Africa is an important hub of genetic resources could be used to justify such a strict interpretive approach. It is hoped that the Model Law will help guard against biopiracy – the illegal appropriation and patenting of genetic resources. The debate around biopiracy also remains controversial and contested. For instance, the US, in responding to an Indian paper on 'Protection of biodiversity and traditional knowledge' during the 5–6 July 2000 meeting of the WTO Committee on Trade and Environment, apparently denied the existence of biopiracy.[29]

One of the major characteristics of the Model Law is its insistence on mandatory labelling of all GMOs and derived products. Such labelling must

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27 In 1998 the EU placed a ban on the approval of new biotech products. The US and Canada and later Argentina on 7 August 2003, after failed consultations with the EU to lift the moratorium, requested the establishment of a panel as provided under the WTO Dispute Settlement Understanding, claiming that the EU ban was impacting on their exports to the EU market, among other claims. The Panel in its interim report issued in February 2006 found that the EU moratorium was inconsistent with its trade obligations under the WTO.

28 Applegate J.S., 'The Prometheus principle: Using the precautionary principle to harmonize the regulation of genetically modified organisms', *Indiana Journal of Global Legal Studies*, 9, 207, 2001.

29 Singh S., 'U.S. not sure what's biopiracy', *South–North Development Monitor*, 4712, 20 July 2000, available at http://www.grain.org/bio-ipr/?id=346.

indicate the relevant GM traits and characteristics in sufficient detail.[30] The Model Law seems to depart from the position on labelling and tracing adopted by the Cartagena Protocol, which allows exporters to indicate that products 'may contain GM ingredients'.[31] While the EU regulations for labelling allow for a minimum threshold for unauthorised GM content of 0.5%, below which the labelling requirements will not apply, the Model Law proffers no threshold disallowing labelling.[32]

Generally the politics behind labelling as opined by the European Parliament is to provide consumers with a real choice between GM food and non-GM food.[33] This argument may not hold much water for Africa, especially during periods of food crisis that leave ordinary people with little or no choice but to accept whatever food they can lay their hands on. As such, labelling requirements may mean nothing to the ordinary African whose immediate worry is how to deal with his/her hunger problem. The Model Law seems to be unrealistic in this regard. In addition, some food donors are concerned that the labelling requirement could add to the costs of and delay delivery of food to starving populations.

It has been argued that adopting such stringent regulations could discourage research, as continued opposition may lead to market shrinkage and provide little incentive to either continue to plant such crops or develop new ones.[34] This could equally affect the ability of countries to make any informed choices about the use of agricultural biotechnology to improve food security.

Legislative overkill (though aimed at ensuring biosafety) could adversely affect the continent's capacity in high-yield crop production, especially as biotechnology allows for a marked increase of crop yield per acre. The Cartagena Protocol, under articles 2(4) and 18(1), enables countries to enact measures necessary to conserve and sustainably use their biodiversity. The Model Law overstretches the Protocol's provisions and to a certain extent fails to take into consideration any of the socio-economic importance of biotechnology. In its article 4(1), the Model Law deals with the requirement for the advanced informed agreement for a risk assessment. The ultimate responsibility of conducting the risk assessment lies with the importing party. The competent authority's decision on approval or rejection

30 Model Law, art. 11(1).
31 Cartagena Protocol, art. 18(2)(a).
32 Burchett P., 'A castle in the sky: The illusory promise of labelling genetically modified food in Europe', *Pennsylvania State International Law Review*, 23, 173, 2004.
33 *Ibid.*
34 Smith F.B., 'The Biosafety Protocol: The real losers are developing countries', National Legal Centre for the Public Interest, 4, 3, March 2000.

depends on the assessed risk.[35] It is therefore incumbent on the importing party to prove that the products are safe and pose no risks to both humans and the environment. The Model Law is therefore fashioned on a process rather than a product-based approach that enables consumers to make an informed choice in the market.[36]

The Model Law could seriously distort efforts by Africa to reap any potential benefits from the use of biotechnology. The high additional transactional costs and increased bureaucratic bottlenecks associated with approvals under the Model Law could dissuade biotech companies from engaging in Africa. This may cause them to focus more on high-value crops aimed at large-scale importing markets, ignoring small and less-valuable markets such as Africa.

The Model Law's response to biotechnology in Africa is based on the fact that countries need to adopt a slow and cautious approach. This type of approach will enable the countries preparing their national legislations to look forward and anticipate problems that presently are not evident. It may, however, affect their ability to use biotechnology to improve domestic agricultural production.

THE SOCIO-ECONOMIC IMPLICATIONS OF THE MODEL LAW FOR FOOD SECURITY AND FOOD SOVEREIGNTY

Socio-economic and cultural considerations are essential in evaluating the impacts of biotechnology and its eventual uptake by African countries, as the majority of their populations are involved in agriculture. These considerations may have informed the Model Law drafters, who recommended that countries thinking of adopting biotechnology should do so with caution. The Model Law authors, however, failed to see any potential in using biotechnology to solve two

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35 Cartagena Protocol, art. 8.

36 These two approaches have remained controversial, especially between the US and the EU on the regulation of GMO and its derived products. They apply mostly when it comes to mandatory labelling of a product as containing GM traits or indicating that it is a GMO. The process-based approach on current GM labelling regulations looks at the processing method, as opposed to the physical and chemical characteristics of the food itself. This is the method the EU adopts, as it views GMO products as novel products and therefore there is a need for specific regulation. The US adopts the product-based approach, which looks at GMO products as a mere extension of their conventional counterparts, and therefore the same laws that govern conventional food will equally be made applicable to GMOs. Labelling therefore becomes mandatory, according to the US, only when the end product differs from the conventional counterpart. The process-based approach has been criticised as fundamentally flawed and unworkable. According to those who have criticised this approach, the real hazards are in the product and not the process by which it was made. The US adopts the 'equivalence concept'.

of the continent's endemic problems – food insecurity and food sovereignty. Though biotechnology is not a panacea for these problems, it has been proposed as a possible way out.

Agriculture in Africa is still predominantly rudimentary, hence the continent's inability to produce enough food to feed more than half of its growing population. Food insecurity issues in Africa are not only a result of the subsistence and primitive form of agriculture: other factors may include lack of incentives to farmers and bad governance. It has been pointed out that provided incentives and good working conditions exist, agricultural yields in Africa could be increased from the marginal 0.8% production rate to a self-sufficient level capable of feeding the continent.[37] Those who hold this view regard Africa's food situation to be too complex to be solved simply by turning to biotechnology.

The current biotechnology revolution across the globe could be likened to the era of the green revolution. The similarity between these two 'revolutions' is that they are both aimed at ensuring food sovereignty and food security through increased food production using high-yielding inputs. In Asia and Latin America, the benefits of the green revolution may have been realised, but the same is not true of Africa. For instance, despite an increased use of fertilisers designed to boost production, yields in the 1970s instead dropped.[38] There is speculation that the failure of the green revolution in Africa was due to the lack of adaptation of the technologies used to African realities. This may or may not be true, but what is certain is the fact that the continent is still battling with the problems of food security and food sovereignty. The backdrop to all this, according to some people, is that Africa therefore cannot afford to miss out on the biotechnology or 'gene' revolution.[39] Though accepting the potentials of biotechnology is one of the possible solutions to the problems of food sovereignty and food security, the greatest challenge is how this could be made to adapt to the existing socio-economic context in Africa.

The Model Law, through its strict provisions, disregards the possibility of using the potential benefits of using biotechnology to improve the continent's dire food situation. The New Partnership for Africa's Development (NEPAD) Office of Science and Technology in its Consolidated Action Plan for Science and Technology, released in 2005, on the other hand, underscores the need for Africa to use biotechnology as an opportunity for alleviating poverty and

37 Kuyek D., 'Genetically modified crops in Africa: Implications for small farmers', GRAIN briefing, August 2002.

38 *Ibid.*

39 *Ibid.*

improving the continent's economic competitiveness. The Action Plan recognises the fact that issues of food sovereignty and food security are closely intertwined with the high poverty rate that underpins development in the continent. These are equally major socio-economic problems that preoccupy both governments and donors.

Food sovereignty has been defined as:

> the right of peoples, communities, and countries to define their own agricultural, pastoral, labor, fishing, food and land policies which are ecologically, culturally appropriate to their unique circumstances. It includes the right to food and to produce food, which means that all people have the right to safe, nutritious and culturally appropriate food and to food-producing resources and the ability to sustain themselves and their societies.[40]

Food sovereignty is closely linked to food security, which refers to a situation where all people, at all times have access to sufficient, safe and nutritious food to meet their dietary needs and food preferences, for an active and healthy life.[41] Food security and food sovereignty have been a priority for countries both at the international and regional levels. International conferences such as the Rome World Food Summit in 1996 and the World Forum on Food Sovereignty in Cuba in 2001 are some of the demonstrated efforts by the international community to seek solutions to issues of food security and food sovereignty.

The extent to which food sovereignty and food security underpin the GMO and biotech debate cannot be overemphasised. The question of whether biotechnology could ensure food sovereignty and food security for developing countries could be undermined by the fact that most biotech products promoted in Africa are cash crops.[42] This may entail that those mostly affected by problems of food security, ie. the rural poor communities, may see few or no benefits from biotechnology. The point is that these communities in Africa are mostly involved in subsistence agriculture, a practice focusing more on food supplies for the grower rather than crops that can be sold.

A report issued by the International Fund for Agricultural Development (IFAD) closely relates biotechnology to issues of poverty and negates the argument that focusing on cash crops would not usher in food security. It states that higher

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40 eFood sovereignty: Turning the global food system upside down', *GRAIN Newsletter Seedling, editorial*, April 2005, available at http://www.grain.org/seedling/?id=329.

41 Rome Declaration and World Food Summit Plan of Action, November 1996.

42 See James C., 'Global status of commercialized biotech/GM crops: 2005', *ISAAA Executive Summary Brief*, 34, available at http://www.africabio.com/pdf/Briefs%2034.pdf.

yields, lower levels of labour and pesticide use, and higher prices for cotton could be essential in alleviating poverty.[43] The one point discernible from the IFAD report is the potential benefit of biotechnology to poverty alleviation, food security and food sovereignty. For instance, there have been testimonies by some South African farmers of how growing Bt cotton has improved their lives. This is marked with increased yields and the use of less pesticide.[44] Despite such strong arguments, we have seen instances where critics of GMOs have argued that problems of food sovereignty and food security are mostly due to issues of distribution, accessibility and poverty rather than insufficient food production.[45]

It is clear from the above discourse that the adoption of the African Model Law's regulatory approach may adversely affect African countries' ability to use biotechnology as one of the possible means of ensuring food security and food sovereignty. The refusal of some African countries to accept food aid on the pretext that it may contain GM grains, in the midst of extreme starvation, raised an international uproar. Therefore Africa needs to balance its development agenda with the need to protect its biodiversity and the health of its people – the major objective of the Model Law.

INTERNATIONAL TRADE AND GMOS IN AFRICA

Legal implications of the Model Law for trade

The role of the WTO in the ongoing debate on GMOs is both crucial and problematic. The WTO has been subjected to very harsh criticisms such as being unsympathetic to issues of health and environmental protection. The February 2006 interim report issued by the Panel on the trade dispute between the US and the EU on the EU's *de facto* moratorium on approval of new GMO approval applications seems to have strengthened this view.[46] The Panel considered only whether the challenged EU measures were consistent with the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement),[47] the Technical Barriers to Trade (TBT) Agreement[48] and the General Agreement on

43 *Ibid.*

44 See Ismail Y., 'Can GM technologies help the poor? The efficiency of Bt cotton adopters in the Makhathini Flats of KwaZulu-Natal, Republic of South Africa', in Regional Cooperation on Biotechnology and Biosafety in Eastern and Southern African Countries. Proceedings of a Regional Workshop on Biotechnology and Biosafety, Kadoma, Zimbabwe, 16–18 July 2001.

45 See Mayet M., 'Why Africa should adopt the African Model Law on Safety in Biotechnology', available at http://www.biosafety.net.

46 CIEL, *op. cit.*

47 WTO, Agreement on Sanitary and Phytosanitary Measures, 15 December 1993, *op. cit.*

48 WTO, Agreement on Technical Barriers to Trade (12 April 1979), 1186 U.N.T.S. 276, available

ariffs and Trade (GATT).[49] To the frustration of anti-GMO critics, it declined to comment or rule on the ethical and moral concerns over GMOs. The greatest challenge to African countries is how they can fulfil their obligations under the Cartagena Protocol and yet not offend WTO rules. This could become a problem if African countries decide to integrate the Model Law into their national biotechnology and biosafety laws.

The Panel in what has become known as the EC Biotech case[50] did not explicitly rule on the issue of available scientific evidence and its uncertainty. It did, however, reiterate that trade-restrictive measures should be based on science and not on speculation or extrapolation about unknown risks of products. It is therefore incumbent upon countries adopting regulations that may impede the free movement of GMOs and related products to ensure that such regulations are not unnecessarily trade-restrictive.[51] This has been an aspect most countries have had difficulties in proving, especially when the regulations have to deal with human health and the protection of the environment. The only time the WTO dispute body has considered human health issues as overriding was in the EC Asbestos case.[52] The report of the Appellate Body (AB) was not clear as to whether its ruling was based on the inherent risks associated with the use of asbestos, thereby justifying the French measures under article XX(b) of GATT.[53] Despite upholding the Panel decision in the EC Asbestos case, the AB reversed the Panel's finding that it was not appropriate to take into consideration the health risks associated with chrysotile asbestos fibres in examining the 'likeness' of products under GATT article III(4). The AB ruling watered down the effect of

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at http://docsonline.wto.org/, accessed 29 January 2006.

49 WTO, Agreement Establishing the World Trade Organization, *op. cit.*

50 WTO, European Communities – Measures Affecting the Approval and Marketing of Biotech Products, WT/DS291/R, WT/DS292/R and WT/DS293/R, 29 September 2006.

51 *Ibid.*

52 WTO, European Communities – Measures Affecting Asbestos and Asbestos-Containing Products, WT/DS135/AB/R, 12 March 2001, available at http://0-www.worldtradelaw.net.innopac.up.ac.za/dsc/ab/ec-asbestos(dsc)(ab).pdf. The French government enacted a regulation banning the use of asbestos and its related products. It justified its ban on the grounds of the human health risks associated with the use of asbestos. Canada challenged the ban as being inconsistent with WTO trade rules, though it did not contest the health hazards associated with chrysotile fibres and the fact that the regulation failed to distinguish between chrysotile fibres and those encapsulated in a cement matrix. Despite finding that the ban violated most of the WTO rules, the panel found that it was justified under art. XX(b) of GATT and it met the necessity test under the chapeau of art. XX. Thus the EC Asbestos case was the first time that an environmental measure passed the necessity test.

53 WTO, European Communities – Measures Affecting Asbestos and Asbestos-Containing Products, *op. cit.*, VII, 3243.

the Panel's findings, which for the first time considered health and environmental issues as critical in the trade environment debate.

Though no African countries were party to the EC Biotech case, they may well be affected by the dispute outcome as they proceed with putting into place their biotechnology regulatory frameworks. The uptake of biotechnology therefore has to be considered within a broad perspective of the international trading relationship with the US and the EU. Adopting such a broad perspective may help dispense fears that Africa's uptake of biotechnology depends more on the continent's trading relationship with the EU than on the health–environmental protection concern.

Developing countries have always found shelter in the special and differential treatment clause of the GATT when dealing with the developed countries. However, the use of the special and differential treatment argument needs to take into consideration the fact that the specific interests of developing countries would not override the legitimate interest of the countries enacting the measures. This view was reiterated by the Panel in the EC Biotech case in considering Argentina's argument under Article 10.1 of the SPS Agreement. The Panel did consider whether the phrase 'take into account' was a mere philosophical consideration or a positive action in favour of developing countries when developed countries adopt their domestic regulations. It is therefore incumbent on any developing country that intends to invoke the special and differential treatment provision to show that the developed country's measures failed to take into account its special needs as a developing country. This may seem to be problematic to African countries keen to make a bold shift in adopting biotechnology and the problems its agricultural products may encounter gaining market access to the EU and other GM-sensitive markets. Another drawback for most African countries would probably be the cost of instituting a WTO dispute against wealthy developed countries such as the EU.

The WTO dispute settlement body has always been very reserved and cautious with the application of rules of public international law in interpreting WTO agreements. It has in very few cases considered non-trade measures to be consistent with relevant WTO agreements.[54] In the US Shrimp case[55] both the Panel

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54 See Matsushita M., 'A review of major WTO jurisprudence', available at http://www.sipa.columbia.edu/wto/pdfs/atsushitaWorkingPaper.pdf.

55 WTO, *United States – Import Prohibition on Certain Shrimp and Shrimp Products*, WT/DS58/AB/R, adopted 12 October 1998. Section 609 of Public Law 101–162 enacted in 1989 by the US prohibited shrimp harvested with technology that might adversely affect certain sea turtles from being imported into the US, unless the harvesting nation was certified to have a regulatory programme for the conservation of sea turtles and an incidental take rate

and the AB reiterated that countries are not allowed to unilaterally take measures affecting trade except within an international context. The WTO is interested in multilateral rather than unilateral regulation of issues that may affect international trade. In this regard its application of the rules of international treaties remains inconsistent. In the US Shrimp case it did consider international treaties signed by at least one of the parties to the dispute. Despite this, it reiterated the fact that the US had an obligation to reach an international agreement before taking any unilateral decision, and on this basis found the US regulation as biased, arbitrary, discriminatory and trade-restrictive. However, in the recent EC Biotech case, the Panel declined to consider any of the international treaties where all the parties are not party to the treaty.

The Model Law is only a regulatory guideline for African countries and will not qualify as an international agreement that any WTO dispute panel may be keen to consider. Where countries incorporate its provisions into their domestic laws, WTO dispute settlement consideration would be on an individual country basis. The Model Law's wide incorporation by African countries could help protect Africa's rich biodiversity. But within the WTO framework, the Model Law could be a potentially trade-restrictive measure liable to sanctions under the WTO dispute settlement procedures.

The trade implications of GMO regulation was a highly contested issue at the negotiations of the Cartagena Protocol, which inspired the strict approach adopted by the Model Law. During the negotiations on the Protocol, major GMO-producing countries strongly opposed any provisions that would impede the free movement of GMOs and derived products. However, the uncertainty, fear and suspicion associated with biotechnology may impede efforts by countries to freely open their markets to GMOs. This was clearly demonstrated with the EU's *de facto* moratorium on GMOs in 1998. These fears and suspicions

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comparable to that of the US, or that the particular fishing environment of the harvesting nation did not pose a threat to sea turtles. The complainants argued that the import prohibition on shrimp and shrimp products was inconsistent with art. XI:1, art. I:1 and art. XIII:1, as it restricted the importation of shrimp and shrimp products from countries that had not been certified, while like products from other countries that had been certified could be imported freely into the US. The US claimed that the measures at issue were justified under art. XX(b) and (g), given that these provisions did not contain jurisdictional limitations, nor limitations on the location of the animals or natural resources to be protected and conserved. The Panel and the AB found that the failure of the US to engage the appellees, as well as other members exporting shrimp to the US, in serious, across-the-board negotiations with the objective of concluding bilateral or multilateral agreements for the protection and conservation of sea turtles before unilaterally enforcing the import prohibition against the shrimp exports of those members was an inconsistent trade measure.

were justified by some controversial laboratory studies in Europe. Laboratory research on monarch butterflies fed on Bt corn pollen by Cornell University researchers and on rats fed on GM potatoes in Scotland in 1998 demonstrated alarming results concerning the impact of GMOs on humans and biodiversity.[56] However, the results of these studies have been subjected to various divergent criticisms. Some scientists criticised the studies as biased and void of clear scientific objectives.[57]

The Model Law therefore places the debate within the socio-economic confines of African society, thereby ignoring to a large extent the likely implications of such an approach for trade. Therefore, while not discarding the Model Law's approach, a more recommended approach for the uptake of GMOs has to go beyond the scope of science and politics. Such an approach therefore requires a holistic approach, which will allow for the possible reconciliation of biotechnology with traditional and agricultural practices. This may help disperse fears that embracing biotechnology would undermine 'African' values.

Underpinning the application of biotechnology and its relationship to trade are issues of cultures and traditions that need to be given attention. Local communities across the developing world have always placed great cultural value on their traditional practices, which constitute a legacy and a spiritual medium for continuity. For instance, local Indian communities in Mexico regard their native seeds as an important element of their culture and a legacy to future generations.[58] Such communities would therefore love to safeguard such practices. Protagonists of biotech, however, may discard this view, as they believe that poor communities stand to make substantial gains through the uptake of biotechnology. Ultimately, the choice should be up to the local farmer, and the real conflict may seem to be between communal tenure and private motivations.

Africa has to deal with its challenges when dealing with the regulation of biotech and GMOs within a more responsive and institutional framework. Such a regulatory framework should aim therefore to balance the potential benefits and risks of biotechnology.

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56 See Matsushita M., *op. cit.*

57 See the Declaration of Scientists in Support of Agricultural Biotechnology, a declaration that as of 22 March 2000 has been signed by more than 1,900 scientists, including prominent scientists made up of Nobel prize winners; available at http://www.agbioworld.org/declaration/petition/petition.php.

58 La Vina A.G.M., 'Genetically modified organisms and the Cartagena Protocol on Biosafety: What is at stake for communities?' *World Resources Institute Working Paper No. 47*, February 2003.

Africa's varying negotiating positions on non-trade issues

Developing countries (including African countries) have often resisted the introduction of non-trade issues at the WTO. They are scared that the agenda of environmental and human rights groups will be taken up by developed countries and used as an excuse to adopt protectionist border measures. To them the WTO should concern itself with only aspects related to the free movement of goods.

African countries in particular at the WTO have opposed vehemently attempts by developed countries to use measures considered as being outside the scope of trade liberalisation to limit or deny them market access for their exports. In this light, the current debate on GMOs in Africa runs in two opposite directions and it reflects the divide that usually characterises Africa's political choices. The lack of any co-ordinated agenda/position in Africa between trade negotiators and negotiators at other non-trade international agreements may blur the position of Africa and prevent it from benefiting from the present global system. In most cases, non-trade agreements like the Cartagena Protocol are negotiated exclusively by officials from government departments like the ministry of environment. They are therefore more motivated in negotiating an agreement that will help in attaining the objectives of their departments. Little or no attention is therefore given to provisions with trade implications in non-trade agreements such as the Cartagena Protocol and the Model Law

Reconciling trade, human health and the environment has been echoed many times in both the WTO and at multilateral environmental agreement negotiations. The Cartagena Protocol espouses this view, though it fails to address the relationship in any substantive provisions. Its preamble states that the interpretation of the Protocol should not imply a change in the rights and obligations of any party under existing international agreements. It further stipulates that the agreement will be mutually supportive of existing international agreements and shall not be subordinated. The Panel in the EC Biotech case argued that for any international agreement to be considered applicable in any WTO case, all the parties need to be party to such an agreement, and it would not suffice if only some of the parties to the dispute are party to the agreement. For Africa, a strong supporter of a strict regulatory mechanism for GMOs, as seen in its participation in the Cartagena Protocol, the Panel's view may be problematic and reliance on the Protocol or the Model Law may fail to deliver any positive outcomes at the level of the WTO.

Consideration of market access for Africa's exports to developed countries' markets, especially the EU and the US, should not be the only pointer for what

policy orientation the continent should adopt. Its policy choices need to be tailored to address its need and should be consistent with its present obligations under the WTO. Despite the strong adherence that African states may have to both the Protocol and the Model Law, their laws on biotechnology and biosafety may sometimes be skewed to suit their main trading partners. With the importance attached to international treaties in WTO disputes, African countries need to be more cautious as to the international treaties they sign and how this can impact on their socio-economic development.

IMPLICATIONS FOR INTELLECTUAL PROPERTY RIGHTS REGARDING THE UPTAKE OF GMOS IN AFRICA

Despite the Model Law's claim to secure Africa-wide adoption, it does not provide any clue to certain issues that currently underpin the GMO/biotech debate. A glaring example that is not dealt with by the Model Law on Biosafety but is covered to certain extent by the Model Law on Breeders and Community Rights is intellectual property rights (IPR). This issue has emerged to occupy a core focus in the GMO debate.

IPR generally are instrumental in inducing investment into new technologies. However, with the development debate taking centre stage in most international gatherings, IPR need to be tailored to relate to the socio-economic environment in which they operate. The greatest challenge in Africa's agriculture is to create positive links among IPR, food security and biotechnology. However, the technology needed to achieve this is in most cases concentrated in the hands of a small number of Western-based multinational corporations. Though we recognise the potentials of using biotechnology, the issue of IPR may undermine the readiness of Africa to embrace its application.

The fundamental question is, therefore, what type of innovation does African agriculture need? Biotechnology uptake may help to complement conventional agriculture. This may lead to high production rates with the use of high-yielding seeds that are less dependent on insecticides and pesticides. However, one of the possible challenges for biotech and the promotion of IPR in Africa is the likely conflict with traditional agriculture. The patenting of biotech innovations could impact on some of Africa's cultural practices, such as seed saving. In Zambia, 95% of the millet crop is grown from farmers' seeds, and even seeds for commercial crops like maize are also supplied from saved seeds.[59]

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59 Kuyek D., *op. cit.*

Will the existing IPR regime undermine such practices? The answer to the above question is riven with divergent views from both proponents and opponents of biotechnology. Critics of extending IPR to biotechnology with special regard to patents on life forms argue that it is inappropriate to reward scientific work in the field of biological resources and processes. They assert that living organisms are qualitatively different from non-living organisms, and knowledge relating to biological processes and biological materials is not an invention.[60] They are also scared that strong IPR regimes will confer monopoly rights on private research organisations and multinational corporations, which will hinder Africa's access to the available technology.

Proponents, on the other hand, argue that a strong patent regime has an incentive to attract foreign direct investment (FDI) for host countries, leading to increased licensing of technologies, and will possibly contribute to more local production. High standards of IPR are therefore required to provide adequate incentives to firms and researchers to innovate and recoup the cost of research and development (R&D), and at the same time give a boost to the economy.[61]

The role of biotechnology in Africa has in the past been very marginal, and research on genetic improvements to local plant varieties was the ultimate task of public research institutes and centres, which were mostly funded by national governments and the donor community. The introduction of protection of plant varieties is expected to foster the privatisation of agricultural research, and it is feared that this trend will have an important economic implication for developing countries. This new trend could be attributed to the recent rush of private biotech multinationals into Africa, which may marginalise public research.

The WTO Trade Related Intellectual Property Rights Agreement (commonly known as TRIPS) provides for a global standard for the protection of intellectual property. IPR are strong inducing investment incentives. Companies therefore are keen to know that their inventions and innovations will receive protection from host states against piracy. This means that they have the exclusive rights to benefit from their inventions or innovations, and it is illegal for anybody else to use such innovations or inventions without their prior consent.

Public institutional research was a strong innovation motivation service in Africa since independence. Because of this public interest vocation, IPR were not such a crucial issue. However, with the recent surge of private-sector-led research

60 'Intellectual property protection and biotechnology: Issues and processes for African consensus.' *A living paper prepared for the 2nd Session of the African Policy Dialogues on Biotechnology* – Southern Africa, Harare, Zimbabwe, 20–21 September 2004.

61 *Ibid.*

in Africa, there is a gradual phasing out of public research. This is being replaced by new initiatives such as public–private partnerships. These new partnerships aim to promote a more responsible and pro-poor research approach in developing countries. For instance, Monsanto, on a royalty-free basis, allowed the Kenyan Agricultural Research Institute (KARI) to develop more-pest-resistant sweet potatoes for Kenyan farmers. In response to these new developments, the recently created African Agricultural Technology Foundation has as its main objective the acquisition of proprietary technology at low cost or no cost for research in Africa. This will help respond to the chronic hunger and disease on the continent and to develop drought- and disease-resistant crops.

Between 1981 and 1985 total expenditure on public agricultural research in sub-Saharan Africa as a percentage of GDP was 0.76%. This figure dropped by 1991 to about 0.58%.[62] This drop coincided with the downturn of the economies of most of the developing countries and the implementation of the Bretton Woods structural adjustment programmes on the continent. Africa's greatest challenge in the biotech revolution is what policy option to adopt that will not undermine its traditional agriculture, but boost production. An adoption of either of the option needs to consider the IPR implications. For instance, if Africa has to consider the need to boost production through the use of biotechnology, then it has to start rethinking a possible reform of its IPR regime.

These policy options depend more on the fact that the needs of small farmers and seed companies are to a large extent different, especially when it concerns IPR, and that this may lead to higher prices and may exclude small poor farmers. Because of the high cost associated with R&D, it is likely that such costs will be transferred to consumers through high prices. For rural poor farmers, such higher prices would lessen their ability to compete on the world market if the technology is widely adopted by richer farmers. However, according to the UN Food and Agriculture Organisation, despite high prices, small farmers in Asia and other developing countries have not been entirely prohibited from using and benefiting from GMOs.[63]

An application of any of the following two kinds of IPR protection for biotechnology may have a serious impact on Africa's agriculture: patents and plant variety protection (PVP). Though these two look distinct, both have the capacity to restrict the rights of farmers. PVP as applied under the 1991 UPOV

62 *Ibid.*

63 La Vina A. & L. Fransen, 'Integrating socio-economic considerations into biosafety decisions: The challenge for Asia', World Resources Institute (WRI), available at http://pdf.wri.org/.

Convention[64] is better suited to the needs of commercial farmers in Europe, where the agricultural population constitutes only a small percentage of the total population. Instituting the PVP and patent systems in Africa therefore has to accommodate the needs of small farmers by focusing on locally important food crops, helping them to improve their yield. Proponents of applying IPR in agriculture and biotechnology premise their argument on the fact that IPR have the capacity to encourage private sector involvement in agriculture. Generally, it is argued that a strong IPR regime encourages the inflow of FDI and brings about technology transfer, thereby stimulating domestic economies. However, strong IPR regimes alone are insufficient for generating strong incentives for firms to invest in a country. It is argued that if that were the case, then recent FDI flows to developing countries would have gone to sub-Saharan Africa and Eastern Europe. But countries like China, Brazil and other high-growth, large-market developing countries with weak IPR protection continue to receive the bulk of all developing countries' FDI.[65]

The questions of poverty and governance remain critical to any effective uptake of GMOs in Africa, since biotechnology on its own will not usher in the much-needed solution to the continent's agricultural and food problems. IPR as a Western concept emerged against the background of a market-based economy aimed at rewarding innovation. This view could be justified if one considers the fact that because of the high investment cost always associated with R&D, IPR allow the inventor to recoup his/her costs. It is feared therefore that if this is the trend, farmers would have to depend on the biotech seed-selling companies, and this may imply a possible shift from their traditional practice of seed saving. While this may seem disadvantageous, countries may, however, employ the use of the farmers' privilege provision of the UPOV Convention allowing for seed propagation to enhance productivity. The greatest limitation to the farmers' privilege is that it does not allow for seed saving or for such seeds to be sold.

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64 The International Union for the Protection of New Plant Varieties of Plants (UPOV) aims to provide and promote an effective system of plant variety protection with the aim of encouraging the development of new varieties of plants, for the benefit of society. The UPOV, though it seems more relaxed in terms of allowing farmers to use the new plant seeds without any authorisation, limits their ability to do so in the same way as patents. The holders of plant breeders' rights enjoy to a certain extent the same rights as those enjoyed by patent holders.

65 Maskus K.E., 'The role of intellectual property rights in encouraging foreign direct investment.' *Paper prepared at the conference on Public–Private Initiative after TRIPS: Designing a Global Agenda*, Brussels, July 1997, available at http://siteresources.worldbank.org/INTRANETTRADE/Resources/maskus2.pdf#search=%22how%20IPR%20induces%20FDI%20in%20Africa%22.

RECOMMENDATIONS AND CONCLUSION

Recommendations

The Model Law needs to be informed by both domestic imperatives and the obligations African countries have in the multilateral trading system. Thus, countries adopting the Model Law provisions need to focus on the possibility of reconciling their environmental concerns and their international trade obligations. This will enable them to articulate their own needs and aspirations on a more acceptable platform and could reap potential benefits from biotechnology.

There is a need to build on the possibility of harnessing public research institutes in Africa, which hitherto have driven most of the research on local crops and innovation in agriculture. Such initiatives could be taken within well-defined public–private partnership approaches.

The collaboration between Monsanto and KARI is a good showcase of how public–private partnership could help develop local crops, with far-reaching impacts on local farmers. Other initiatives in the continent that seem to embody this approach at regional levels include those supported by the US Agency for International Development Agricultural Biotechnology Support Programme, the UNEP-GEF Capacity Building Project on Biosafety and the AU Commission high-level African Panel on Biotechnology. These should facilitate open and informed regional multi-stakeholder dialogue on, among other things, scientific, technical, economic, health, social, ethical, environmental, trade and intellectual property protection issues associated with or raised by rapid developments in modern biotechnology.

The adoption of GMOs in Africa should depend on the need to refocus the entire current debate so as to become pro-poor. The mired existing relationship between trade and biosafety has caused certain African states not to anticipate significant advantages from the adoption of GM technologies. These anticipations seem to be fuelled by strong anti-GMO sentiments in the EU. A more liberal IPR regime may help debunk the myth regarding GMOs and the multinationals that has surrounded the current debate. Such a liberal approach may also accommodate investments in crops that are more beneficial to African farmers. A blending of market-driven and public-funded research may help provide benefits where little or no profit opportunity exists.

CONCLUSION

The uptake of biotechnology in Africa is an issue intertwined with varying complexities. Reading the Model Law, one gets the impression that such an uptake would depend on the safety of biotechnology for both humans and the environment. However, other issues such as IPR, and trade and non-trade issues remain salient in informing an African definite position on GMOs and biotechnology. The Model Law's emphasis on biosafety seems contradictory to NEPAD's Plan of Action to use biotechnology to achieve food sovereignty and food security. These issues are critical in informing the biotechnology policy orientation in African countries and the need for them to balance the ultimate need to feed their starving populations and protect their biodiversity.

It was hoped that the WTO ruling in the EC Biotech case would help clarify the debate. The Panel's refusal to comment on some of the peculiar issues as to whether GMOs are safe or are equal to conventional products may not help to keep the debate within any confines. In Africa, this debate will no doubt continue on very divergent grounds, with growing focus on the socio-economic and cultural implications and challenges of GMOs, especially for agriculture.

Chapter 4

The EC Biotech Case and Its Implications for SADC Countries

Loretta Feris[1]

INTRODUCTION

The two most powerful economic blocs, the US and EU, have adopted divergent approaches to the regulation of GMOs. In the US, many GM crop varieties have been commercially produced and marketed, while in the EU, few varieties have been approved: a *de facto* moratorium limited EU production, import and domestic sale of most GM crops from late 1998 to April 2004, and since then strict labelling regulations and a slow approval process are reportedly having a similar effect. Apart from the approvals process, some EU member states maintain national marketing and import bans even on GM varieties that have been approved by the European Commission (EC).

The trade impact of the EU's 1998 ban was immediate and adversely affected exporters of GM produce to the EU. The US share of EU maize imports, for instance, fell from around two-thirds in the mid-1990s to almost zero. The GMO-adopting countries lost market share to GMO-free suppliers, sparking fears that EU member countries or other food-importing countries would deny market access to products of food-exporting countries if any GM products are grown or even imported into those exporting countries.

The EU position was further strengthened when the Cartagena Protocol on Biosafety came into force in September 2003. This Protocol seeks to provide a framework for dealing with trans-boundary movement (including trade) of LMOs and the environmental uncertainties posed by them. It explicitly incorporates the precautionary approach, but does not provide criteria by which countries can be found to have abused the right to implement a precautionary policy. Unsurprisingly, the EU actively began to draw on the Protocol to justify its moratorium on the approval of GM imports.

The increased disenchantment over the way in which the EU applied its precautionary measures prompted the US, Canada and Argentina to seek the

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establishment of a WTO Dispute Settlement Panel on 29 August 2003 to rule on the WTO compatibility of these measures. This raised the expectation that a WTO decision on this matter would clarify trade obligations regarding GM products and resolve some of the inconsistencies in not only international agreements, but also domestic regulation.

It also raised the expectation that it would serve to inform appropriate regulation in SADC, where GMO regulation is generally informed by two pressing needs: ensuring the safety of GM crops for both human health and the environment, and protecting members' trading relations with key export markets in the EU. Arguably, the absence of home-grown harmonised regional biotech regulatory regimes in SADC renders member countries susceptible to espousing positions that may not be in their present or long-term strategic interest simply out of pressure to align themselves with the positions of important external trading partners. This raises a number of critical questions:

1. What are the critical drivers of biotech regulation in SADC countries?
2. In what direction are SADC countries leaning in terms of their policies and attitude to GMO regulation?
3. To what extent do external trading partners inform regional policies and regulatory approaches towards trade in GM products?
4. And, most importantly, what would be the impact of the outcome of the EU–US WTO dispute on regional approaches to trade in GM products?

In an attempt to address these questions, the chapter assesses the overarching trade and environment framework within which SADC countries need to locate their own domestic legal regimes. This includes an assessment of what is known as the EC Biotech case[2] and international environmental regulations pertaining to GMOs. It furthermore analyses existing biotech regulatory approaches in SADC, and discusses the impacts of the EC Biotech case for these countries.

BACKGROUND TO THE EC BIOTECH CASE

Introduction

The US and EU have adopted quite different approaches in dealing with GMOs. This divergence in approaches has been at the centre of the trade controversy on biotechnology-related goods between the US and the EU in the WTO. The US, for instance, has adopted a more liberal approach in dealing with biotechnology

2 WTO, *European Communities – Measures Affecting the Approval and Marketing of Biotech Products*, WT/DS291/R, WT/DS292/R and WT/DS293/R, 29 September 2006.

and its derived products, an approach that brings products within the same regulatory realm as conventional products. The EU, on the other hand, has adopted a more conservative and cautious approach in dealing with products containing GMOs. It needs to be stressed, however, that despite a common EU approach, there have been instances of visible splits among the member states, such as the controversy over the authorisation of Bt maize under Directive 90/220 by the EC.[3]

The difference in approaches centres on the question of whether GMOs and products containing GMOs are 'novel' products or simply an extension of existing 'conventional' products. The US consider GMOs as not new – as opined by the EU and other anti-GMOs critics – but merely an extension of existing products. Therefore, unlike the EU, which has developed new regulations in dealing with GM-derived products, the present statutory laws in the US apply *mutatis mutandis* to GMOs. Apart from the difference in approaches, another striking aspect is the regulatory institutional framework in place in both the US and the EU to oversee the implementation of the statutory regulations.

The US's regulatory framework

US regulations on GMOs are loosely assembled, and no single authority holds the ultimate power of oversight over products that have been genetically altered. What has emerged according to the Coordinated Framework for the Regulation of Biotechnology[4] is a principle of shared responsibilities among the various designated institutions, ie. the US Department of Agriculture (USDA), the Environmental Protection Agency, the Food and Drug Agency (FDA) and the Animal Plant and Health Inspection Services.[5] These agencies generally apply a lenient approach to GMOs. The USDA, for example, conducts routine inspections of processing plants and physical examinations of product releases. Thus, it has the capacity to detect and correct visible observable food-safety and sanitation problems. Producers of GM products are not, however, required to obtain permits prior to the import or release of a GM product into the environment. The agency only requires notification of the introduction of plants with which the USDA already has sufficient experience.[6] In addition, the agency

3 Stewart T.P. & D.S. Johanson, 'Policy in flux: The European Union's laws on agricultural biotechnology and their effects on international trade', *Drake Journal of Agricultural Law*, 4, 2003, pp. 243–44.

4 Available at http://usbiotechreg.nbii.gov/Coordinated_Framework_1986_Federal_Register.html, accessed 7 February 2006.

5 *Ibid.*

6 Vollendorf T.N., 'Genetically modified organisms: Someone is in the kitchen with DNA, who

has observed that some GMOs no longer pose a risk, and are thus not subject to regulation.[7] Generally, the view adopted by the US is that products derived through biotechnology are simply an extension of the products that already exist.[8]

For purposes of labelling, producers must indicate that the GM material in the product is 'generally recognised as safe'.[9] The FDA in essence adopts a voluntary labelling system that 'avoids the possibility of misinforming the consumers' by requiring GM foods to be labelled if they 'differ substantially' from their conventional non-GM products.[10] This is what is referred to as the 'equivalence concept'. Labelling is subjected to the materiality test, ie. the producer must show that because of the presence of the modified genetic material, the product's nutritional values are quite different from its conventional non-GM products and therefore not equivalent.

The EU's regulatory framework

Europe has taken a cautious position on GMOs and the release of GMOs in the European market, based on concerns relating to human and animal health, environmental impacts, ethical considerations and socio-economic considerations such as the survival of traditional farming methods and impacts upon indigenous and local communities.[11] Consumer attitudes, boosted by health scares such as the 'mad cow disease' and foot-and-mouth disease outbreaks, have contributed to this position. Thus, in light of 'scientific uncertainty' and 'consumer mistrust', the EU in October 1998 stopped approving new GMOs that would be placed on the market. A group of six member states (France, Denmark, Italy, Greece, Austria and Luxembourg) declared that they would vote against any GMO marketing application until further rules were put into place ensuring firstly that GM products can be traced back to their source, and secondly that all GM-derived products are labelled as such.

The EU has based its statutory regulations on the precautionary principle as embedded in a number of international conventions and treaties such as

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is responsible when someone gets burned?', *Mississippi College Law Review*, 21, 2001, p. 43.

7 *Ibid.*, p. 47.

8 Stewart T.P. & D.S. Johanson, *op. cit.*

9 Federal Foods, Drug and Cosmetic Act (FFDCA), sec. 402 (a)(1).

10 Burchett P., 'A castle in the sky: The illusory promise of labelling genetically modified food in Europe', *Pennsylvania State International Law Review*, 23, 2004, p. 173.

11 EC, 'WTO case on GMOs', 17 June 2003, available at http://europa.eu.int/comm/trade/goods/agir/pr170603_en.htm, accessed 15 January 2006.

Principle 15 of the Rio Declaration[12] and the Cartagena Protocol on Biosafety to the Convention on Biological Diversity adopted in 2000.[13]

The first EU law on GMOs was Directive 90/220, adopted on 23 April 1990, which addressed some of the burning issues of biotechnology such as mandatory pre-market approval, environmental release and labelling. Unlike the US approach, which considers GM products as being equal to non-GM conventional products (the equivalence principle), EC Directive 90/220 treated GM products as 'novel' products, hence the need for a specific regulatory framework. Over and above applying to products considered as novel products, the directive also applied to all GMOs in which the genetic material has been altered in a way that does not occur naturally by mating or natural recombination.[14] Emphasis is therefore on the alteration. The directive lays down the pre-market approval procedure that a manufacturer must fulfil for the release of GMOs in the EU and requires that the product must be labelled. However, for labelling purposes, producers only had to include the name of the product and any GM ingredients used, the name and address of the manufacturer, the measures that should be taken in case of unintended release and recommendations.[15]

The EU introduced a new regulation in 1997 that put in place a new mandatory labelling rule. The centrepiece of the regulation was the wide definition of what is referred to as 'novel foods'. This is much wider than what is covered by the 1990 directive. The regulation in pursuit of the EU precautionary principle shifted the burden of scientific proof onto the manufacturer of foods derived from GM material to determine whether a product falls outside the regulation.[16] The regulation also allows a manufacturer to introduce certain products containing GM material without any pre-market approval, but this is possible only on the basis of scientific evidence.[17] This approach can be likened to the US 'generally recognised as safe' approach. Unlike Directive 90/220, the new regulation mandated that manufacturers of novel foods indicate any characteristics of the products used and the production method.[18] Another aspect that Regulation

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12 UN Earth Summit, Rio Declaration on Environment and Development. *Press summaries*, 1–12 June 1992.

13 Secretariat of the Convention on Biological Diversity, Biosafety and the Environment: An Introduction to the Cartagena Protocol on Biosafety, available at http://www.biodiv.org, accessed 29 January 2006.

14 Francer J., 'Frankenstein foods or flavor savers?: Regulating agricultural biotechnology in the United States and Europe', *Virginia Journal of Social Policy and the Law*, 7, 2000, p. 10.

15 *Ibid.*, p. 11.

16 Regulation (EC) No. 258/1997, arts. 4 & 6(1).

17 *Ibid.*

18 Regulation (EC) No. 258/1997, art. 8(1)(a).

258/97 addressed was bulk food shipment. The regulation required that where there are unknown GM portions of foods, the manufacturer must indicate that there is a possibility that a portion of the foods may be genetically modified.[19]

However, despite the mandatory labelling requirement, Regulation 258/97 failed to provide a uniform labelling standard within the EU. A case-by-case approach was still being used, and in the midst of all these uncertainties, member states began developing their own labelling standards. In 2001 the EU adopted a series of new regulations that dealt with specific issues. The new regulatory framework covered issues such as the environmental release of GMOs (Directive 2001/18), authorisation procedures for new foods and feed containing or produced from GMOs (Regulation 1829/2003), and labelling and traceability standards (Regulation 1830/2003). The new regulations provide for risk assessment and risk management principles laid down in Regulation 178/2002 dealing with food safety. An expanded approach to risk assessment takes into account cumulative long-term effects on human health and the environment, including biological diversity, and effects on non-agricultural ecosystems, showing both previous and existing risk. Risk assessment comprises four steps: hazard identification, hazard characterisation, exposure assessment and risk characterisation.[20] It includes direct or indirect, immediate or delayed effects on human health and the environment.[21] Risk management procedures are equally comprehensive and involve public participation, mandatory monitoring and termination of unauthorised releases.

While the new framework still requires the filing of a notification authorisation by the manufacturer to be sent to the competent national authorities in whose territory the GM product is to be released, the application has to be reviewed by the European Food Safety Authority (EFSA), which will conduct a scientific risk assessment. The EFSA risk assessment evaluation will be sent to the member state's Standing Committee on Food Chain and Animal Health, which has to provide its opinion. Where it fails to adopt a decision, the EC shall then refer the decision to the European Council, which has to adopt a measure within three months by qualified majority. However, if the Council fails to reach a decision, the EC shall adopt the decision.[22] Authorisations under the new framework are limited to a ten-year period, irrespective of whether the food in question is for environmental release or placement on the market.[23] Where a GM product has

19 Regulation (EC) No. 258/1997, arts. 8(1) & 8(2).
20 Regulation (EC) No. 178/2002, art. 3(11).
21 Regulation (EC) No. 178/2002, art. 3(12).
22 Regulation (EC) No. 178/2002, arts. 22(5)(c) & 58.
23 EU, 'Questions and answers on the regulation of GMOs in the EU', Memo/02/160/(2003)20.

been approved for EU-wide marketing, member states may not restrict trade in that product. They may, however, adopt provisional safeguard measures to restrict trade in such a product if there are reasons to believe, based on new or additional information, that the product constitutes a risk to human health or to the environment.[24]

The new framework, just like the previous regulations, also introduced a mandatory labelling requirement for all GMOs. Regulation 1830/2003, article 21 places an obligation on producers to label authorised GMOs and products with information about GM content. The regulation, however, provides for instances where technically unavoidable traces of an authorised GMO cannot be excluded.[25] Under such circumstances, the regulation provides for a *de minimis* threshold of 0.9% where labelling will not be required. Labelling will also not apply to food produced from GMOs. For example, food produced from animals fattened on GM feed will not be subject to the regulation. The label must indicate which ingredients have been genetically modified, and in the case where many of the ingredients used are GMOs, the producer must affix to the product the words 'genetically modified'.[26] One of the justifications the EU advances for labelling is that instead of having a discriminatory impact as opined by the US, it will only help to demystify GMOs.[27]

The new regulatory framework also provides new tracing requirements based on the one-step-forward-one-step-back principle.[28] This system allows for the possibility of a swift retrieval of a product in the food supply system in the event of a food safety crisis. Traceability is also fundamental in the implementation of the labelling of GM foods and GM feed. Tracing is carried out through the risk assessment from the EFSA and the Community Reference Laboratory, to which the producer must indicate the method of detecting the product in samples. The new traceability system provides that all products and parties involved in the process must be identified, and this information has to be retained for five years.[29]

On 6 April 2004 a new regulation was adopted by the EC, Regulation 641/2004, which applies to the implementation of Regulation 1829/2003 on the application of authorisations of new GM foods and feed and the notification of existing

24 Directive 2001/18, art. 23.
25 Regulation (EC) No. 1829/2003, art. 12.
26 *Ibid.*, art. 4(6).
27 *Ibid.*, no. 13, p. 10.
28 Regulation (EC) No. 178/200, arts. 3(15) & 18.
29 *Novel EU Regulations for Labelling and Traceability of Genetically Modified Organisms*, available at http://www.eurofins.com/food-testing/food-analyses/gmo-eu-regulations-labelling-traceability/, accessed 25 January 2006.

products, especially with regard to the adventitious or technical presence of GM material that has benefited from a favourable risk evaluation.[30]

In summary, the EU regulatory system is based on authorisation linked to an environmental and health risk assessment, and once a GM product is placed on the market it must be labelled and traceable at all times. It is undoubtedly a much more rigorous and time-consuming process than the US system, and ultimately restricts unconstrained access of GM products to the EU market.

THE EC BIOTECH CASE AND THE REGULATION OF INTERNATIONAL TRADE IN GMOS UNDER THE INTERNATIONAL TRADE RULES OF THE WTO

The facts

On 13 May 2003 the US and Canada requested consultations with the EU concerning certain measures taken by the EU and its member states affecting agricultural and food imports from the US and Canada.[31] The two countries asserted that the moratorium applied by the EU since October 1998 on the approval of biotech products had restricted imports of agricultural and food products from their two countries. They furthermore asserted that a number of EU member states maintain national marketing and import bans on biotech products even though those products have already been approved by the EU for import into and marketing in the EU. On 14 May 2003 Argentina requested consultations with the EU on the same matter.

On 7 August 2003 the US, Canada and Argentina each requested the establishment of a WTO Dispute Settlement Panel. The Panel was established under the WTO Dispute Settlement Understanding to consider the consistency of various measures taken by the EU and EU member states with WTO rules. The US, Canada and Argentina challenged three types of measures:

Firstly, the EU moratorium on approvals of biotech products: The claimants argued that a *de facto* suspension of the approval of biotech products amounted to a general moratorium on such products, and that pursuant to the moratorium, the EU has suspended consideration of applications for, or granting of, approval of biotech products. The EU denied the existence of a general moratorium on

30 EU, Official Journal of the European Union, http://europa.eu.int/eur-lex/en/oj/<http://europa.eu.int/eur-lex/en/oj/, 6 April 2004.

31 For the sake of clarity, although this is called the EC (European Communities) Biotech case, all discussion will refer to the EU (European Union), not to the European Community/Communities.

the approval of biotech products and submitted that the alleged practice alone, not based on a formal or informal instrument, would not constitute a measure under WTO agreements.

Secondly, various product-specific EU measures related to the approval of biotech products: In this regard it was argued that the EU failed to consider specific applications for approval of biotech products and that such failure also constituted a violation of WTO agreements. The EU argued that failing to deal with product applications within a specified timeframe could not be considered a measure, and thus would only be subject to provisions dealing with the application, rather than development of a measure.

Thirdly, various EU member state measures related to the import and/or marketing of specific biotech products: The claimants challenged safeguard measures enacted by certain EU member states, including France, Germany, Italy and Greece. They argued that these measures were not based on scientific evidence, as required by WTO rules. The safeguard measures, permitted by EU regulations, allow EU member states to limit the importation or marketing of certain biotech products already approved by the EU. The EU, however, argued that these measures, given their provisional nature, were in full compliance with relevant WTO disciplines.

Almost three years later, on 7 February 2006, the Panel issued an interim report on the matter.[32] The panel finally issued its final report, *European Communities – Measures Affecting the Approval and Marketing of Biotech Products*[33] (hereafter *EC Biotech case*), on 29 September 2006. The discussion below analyses the international trade regulations pertaining to GMOs in the context of this case.

WTO rules pertaining to GMOs

The WTO not only institutionalises international trade disciplines, it also provides binding rules on international trade. A number of WTO agreements regulate trade in GMOs, including the SPS Agreement,[34] the TBT Agreement,[35]

32 WTO, WT/D5291/INTERIM, 7 February 2006.

33 See no. 32, above.

34 WTO, Agreement on Sanitary and Phytosanitary Measures 15 December 1993, GATT Doc. MTN/FA II-AIA-4, available at http://www.wto.org/english/tratop_e/spsagr_e.htm, accessed 29 January 2006.

35 WTO, Agreement on Technical Barriers to Trade (12 April 1979), 1186 U.N.T.S. 276, available at http://docsonline.wto.org/, accessed 29 January 2006.

the GATT[36] and the Agreement on Agriculture.[37] The WTO establishes a hierarchy of international agreements if there is a conflict between WTO rules, with the SPS and TBT Agreements taking precedence over the GATT.[38]

The SPS Agreement

Overview

The SPS Agreement aims to elaborate the rules for the 'application of the provisions of GATT 1994 which relate to the use of sanitary and phytosanitary measures'.[39] The Agreement applies to all sanitary and phytosanitary measures that directly or indirectly affect international trade.[40] For any measure to comply with the Agreement, the measure must be 'necessary to protect human, animal or plant life or health',[41] it must be based on 'scientific principles'[42] and there must be 'sufficient scientific evidence'[43] to justify the measure.

These measures may not be discriminatory or 'constitute a disguised restriction on international trade'.[44] The SPS Agreement requires that measures should be based on a risk assessment,[45] and when assessing risk, signatories must 'take into account available scientific evidence', 'avoid arbitrary or unjustifiable distinctions' and avoid measures that are more 'trade-restrictive than required'.[46]

The Agreement also has provisions that require notification when there are

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36 WTO, Agreement Establishing the World Trade Organization, Annex A: Multilateral Agreements on Trade in Goods – General Agreement on Tariffs and Trade 1994, available at http://docsonline.wto.org/, accessed 29 January 2006. For a history of the WTO and its agreements, see Jackson J., *Legal Problems of International Economic Relations: Cases, Materials and Text on the National and International Regulation of Transnational Economic Relations*. New York: Lexis, 1995, pp. 289–326

37 WTO, Agreement on Agriculture, art. 4.2, available at http:// www.wto.org/english/docs_e/legal_e/14-ag.pdf, accessed 29 January 2006.

38 WTO, 'WTO general interpretive note to Annex 1A', available at http://www.wto.org/english/docs_e/legal_e/05-anx1a_e.htm, accessed 29 January 2006.

39 SPS Agreement, 8th preambular clause.

40 *Ibid.*, art. 1(1).

41 *Ibid.*, art. 2(1).

42 *Ibid.*, art. 2(2).

43 *Ibid.* In the case of *Japan – Measures Affecting Agricultural Products*, WT/DS76/AB/R, 22 February 1999, the AB interpreted the phrase 'sufficient scientific evidence' to mean that there must be 'a rational or objective relationship between the SPS measure and scientific evidence ... to be determined on a case-by-case basis and will depend on the particular circumstances of the case, including the characteristics of the measure at issue and the quality and quantity of the scientific evidence' (para. 84).

44 SPS Agreement, art. 2.3.

45 *Ibid.*, art. 5(1).

46 *Ibid.*, arts. 5.1, 5.2, 5.5 & 5.6.

changes in measures and requires that these measures be reasonable.[47] In *European Communities – Measures concerning Meat and Meat Products* (hereafter the EC Beef Hormones case)[48] the AB maintained that the risk to be assessed under article 5 of the SPS Agreement should not be a 'theoretical uncertainty', but rather an 'ascertainable risk'.[49]

The SPS Agreement furthermore lays down certain procedural requirements and Annex C of the SPS Agreement on Control, Inspection and Approval Procedures provides in paragraph 1 (emphasis added):

> Members shall ensure, with respect to any procedure to check and ensure the fulfilment of sanitary or phytosanitary measures, that: (a) such procedures are undertaken and completed *without undue delay* and in no less favourable manner for imported products than for like domestic products.

Article 8 directs members to observe the requirements in Annex C. Article 7 mandates transparency in procedures and states that 'members shall notify changes in their sanitary of phytosanitary measures and provide information on their sanitary of phytosanitary measures in accordance with the provisions of Annex B'. The latter provides for publication of regulations, enquiry points and notification procedures.

The SPS Agreement in the EC Biotech case

The complainants in the EC Biotech case averred that the EU contravened provisions on risk assessment and scientific principles, discrimination and procedural requirements in that the moratoria were not based on a risk assessment, that they were not based on scientific principles, that they were discriminatory and amounted to a disguised restriction on trade, and that the procedural provisions were violated. Argentina also claimed that article 10.1 was violated. It provides that in the preparation and application of SPS measures, the special needs of developing countries must be taken into account.

The EU argued that its measures are applied in part for purposes that are identified in Annex A(1) of the SPS Agreement and in part for other purposes. As a result, the EU submitted that to the extent the relevant EU approval

47 *Ibid.*, arts. 7, 8.
48 WTO, *EC – Measures concerning Meat and Meat Products*, WT/DS26/AB/R and WT/DS48/AB/R, 16 January 1998.
49 *Ibid.*, para. 180.

legislation is applied for purposes that are identified in Annex A(1), it is governed by the SPS Agreement; to the extent the legislation is applied for other purposes, it falls within the scope of another WTO agreement, possibly the TBT Agreement.[50] The Panel agreed with this view and stated that since approval procedures are conducted for a number of purposes (namely, to avoid various adverse effects), it may conceivably be warranted to view each of the relevant EU approval procedures as incorporating an SPS measure as well as a non-SPS measure.[51]

Overall, the Panel found that Directives 90/220 and 2001/18 constitute SPS measures.[52] In assessing the purposes of the EU approval regulation, the Panel determined that the purpose of Directives 90/220 and 2001/18 is to protect human health and the environment from adverse effects on human health and the environment that might result from the deliberate release of GMOs into the environment.[53] The Panel noted that this was in accordance with Annex A(1)(a) and (b) of the SPS Agreement, which covers measures applied to protect animal and plant life or health from certain risks. Thus, to the extent that Directives 90/220 and 2001/18 are applied to protect animals and plants as part of their purpose of protecting the environment, 'they are not *a priori* excluded from the scope of application of the SPS Agreement.'[54] The Panel proceeded to consider the meaning and scope of some of the terms and phrases used in Annex A(1)(a) through (d) and address whether certain potential effects of GMOs identified in the directives meet the definition of these terms and phrases. It found that of the potential adverse effects of GMOs identified in Directive 2001/18, a number of them do indeed fall within the scope of Annex A(1)(a), (b) and (c) of the SPS Agreement.[55]

With regard to labelling, the Panel determined that the labelling requirement in Directive 2001/18 is rationally related to the purpose of protecting human health and the environment. It accordingly presumed that the labelling requirement is applied to protect human health and the environment from possible unanticipated effects of GMOs. Thus, to the extent it is applied to protect the environment, it would fall within the scope of Annex A(1)(a), (b) or (d), and to the extent it is applied to protect human health, it would fall within the scope of Annex A(1)(b)

50 EC Biotech case, para 7.172.

51 *Ibid.*

52 It found that while Regulation 258/97 does not meet the purpose element of the definition of the term 'SPS measure', to the extent that it seeks to prevent novel foods from being a danger for the consumer, it constitute an 'SPS measure' (EC Biotech case, 49, paras. 7.416 & 7.432).

53 *Ibid.*, para. 7.196.

54 *Ibid.*, para. 7.207.

55 *Ibid.*, paras. 7.212–7.379.

or (c). Accordingly, the Panel found that the labelling requirement in question brings Directive 2001/18 within the scope of the SPS Agreement.[56]

It concluded that Directives 90/220 and 2001/18 as well as Regulation 258/97 (to the extent that it seeks to prevent novel foods from being a danger to the consumer) are SPS measures that may, directly or indirectly, affect international trade within the meaning of article 1.1 of the SPS Agreement, and, as such, are subject to the provisions of the SPS Agreement.[57]

The Panel furthermore found that a general moratorium on approvals was in effect in the EU between June 1999 and August 2003.[58] It applied *de facto*, ie. 'without having been adopted through a formal EC rule- or decision-making process, and, furthermore, that the final approval of applications was prevented by the Group of Five countries and/or the Commission through their actions and/or omissions'.[59] This moratorium, ie. the alleged failure to consider an application for final approval, does not, however, constitute an 'SPS measure' within the meaning of Annex A(1)(a) of the SPS Agreement, since it is a decision concerning the application, or operation of a procedure and not an actual procedure or requirement.

With regard to the measures taken by the EU, the Panel found that in light of the fact that the moratorium, ie. the decision to delay final approval, did not achieve or imply a particular level or protection and is merely procedural in nature, it does not amount to an SPS measure and it does not violate article 5.1, which requires WTO members to base their SPS measures on a risk assessment.[60] For the same reasons, the Panel found no violation of article 5.6, which provides that SPS measures must not be more trade-restrictive than required to achieve the appropriate level or protection,[61] or article 5.5, which prohibits members from using 'arbitrary or unjustifiable distinctions in the levels of protection it considers to be appropriate in different situations, if such distinctions result in discrimination or a disguised restriction on international trade.'[62] It also

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56 *Ibid.*, para. 7.391.

57 *Ibid.*, para. 7.436.

58 *Ibid.*, para. 7.1272. It applied to all applications for approval that were pending between June 1999 and August 2003 under Directives 90/220 and/or 2001/18 or under Regulation 258/97.

59 *Ibid.*

60 *Ibid.*, para. 7.1395. In para. 7.1386, the Panel concluded: 'We consequently found that although requirements and procedures as such may in accordance with the Annex A(1) definition constitute SPS measures, the application of such requirements and procedures would not, itself, meet the definition of an SPS measure.'

61 *Ibid.*, para. 7.1404.

62 *Ibid.*, para. 7.1419.

found no violation of articles 2.2,[63] 2.3,[64] Annex B(1)[65] and article 7[66] of the SPS Agreement.

The Panel established that the EU violated the requirement in Annex C of the SPS Agreement, which requires that procedures are undertaken and completed *without undue delay*, as well as article 8 of the SPS Agreement, which directs members to observe the requirements in Annex C(1)(a). The Panel noted that the first clause of Annex C(1)(a) requires that there not be any 'unjustifiable loss of time', and that what matters is whether there is a 'legitimate reason, or justification', for a given delay, not the length of a delay as such.[67] A determination of whether a particular approval procedure has been undertaken and/or completed 'without undue delay' must, according to the Panel, be made on a case-by-case basis, taking account of relevant facts and circumstances.[68] It furthermore suggested that the phrase 'without undue delay' relates to both the 'undertaking' and 'completion' of the approval procedure.[69]

The Panel thus concluded that the perceived lack of adequate legislation dealing with a particular issue, ie. labelling and traceability, cannot be a justification for the delay.[70] It noted that alternatives were available to the EU. For instance, the EU could have tried to obtain from applicants either voluntary commitments or a request for suspension of the relevant approval procedure pending the adoption of the new EU legislation, or it could have imposed other requirements as conditions attached to approval decisions, provided

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63 It states: 'Members shall ensure that any sanitary or phytosanitary measure is applied only to the extent necessary to protect human, animal or plant life or health, is based on scientific principles and is not maintained without sufficient scientific evidence, except as provided for in paragraph 7 of Article 5.'

64 It states: 'Members shall ensure that their sanitary and phytosanitary measures do not arbitrarily or unjustifiably discriminate between Members where identical or similar conditions prevail, including between their own territory and that of other Members. Sanitary and phytosanitary measures shall not be applied in a manner which would constitute a disguised restriction on international trade.'

65 Annex B(1) of the SPS Agreement provides as follows: 'Members shall ensure that all sanitary and phytosanitary regulations which have been adopted are published promptly in such a manner as to enable interested Members to become acquainted with them.'

66 Art. 7 of the SPS Agreement provides as follows: 'Members shall notify changes in their sanitary or phytosanitary measures and shall provide information on their sanitary or phytosanitary measures in accordance with the provisions of Annex B.'

67 EC Biotech case, para 7.1496. The Panel noted, however that 'a lengthy delay for which no adequate explanation is provided might in some circumstances permit the inference that the delay is "undue".'

68 *Ibid.*, para. 7.1497.

69 *Ibid.*, para. 7.1501.

70 *Ibid.*, para. 7.1514.

the imposition of such requirements was WTO-consistent.[71] Procedural delays can also not be used as an instrument to manage or control risks, as members could evade the obligations to be observed in respect of substantive SPS measures, such as article 5.1, which requires that SPS measures be based on a risk assessment.[72]

The Panel furthermore concluded that the lack of science or the application of a prudent or precautionary approach can also not justify a delay. It stated that if relevant scientific evidence were insufficient to perform a risk assessment, pursuant to article 5.7 of the SPS Agreement, a member may provisionally adopt an SPS measure on the basis of available pertinent information.

The Panel thus found that deferring substantive decisions on the grounds of a perceived need for caution and prudence in the assessment of applications may in fact rob Annex C(1)(a) of any effect or meaning.[73] A range of options remain available to members, and where it is impossible to provide a straight yes or no to applicants, members may in principle provide time-limited approvals or approvals subject to other appropriate conditions. Alternatively, they may reject applications, subject to review if and when relevant circumstances change.[74] The Panel noted, however, that under certain circumstances delays may in fact be just, for instance if new scientific evidence comes to light that conflicts with available scientific evidence and based on this new evidence approvals are suspended.[75] Similar findings were made with regard to product-specific measures.[76]

With regard to article 10, the Panel found that the EU did not act inconsistently with its obligations under this section. While the EU must take account of the interests of developing country members in applying its approval legislation, it may at the same time take account of other legitimate interests, such as those of its own consumers, the environment, etc.[77]

With respect to the safeguard measures enacted by individual EU member states, the Panel ruled each measure in violation of article 5.1, which requires that a measure be based on a risk assessment. It furthermore determined that the national safeguard measures were inconsistent with the requirements under article

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71 *Ibid.*, para. 7.1515. It also noted that new legislation is by nature a time-consuming process and if a member could suspend and, consequently, delay the granting of final approvals essentially every time it completes and updates its approval legislation, there might be frequent and long periods of time during which final approval decisions are suspended.

72 *Ibid.*, para. 7.1517.

73 *Ibid.*, para. 7.1527.

74 *Ibid.*

75 *Ibid.*, para. 7.1532.

76 *Ibid.*, para. 7.2420.

77 *Ibid.*, para. 7.1621.

5.7, which applies in cases 'where relevant scientific evidence is insufficient', and which allows members to adopt provisional sanitary or phytosanitary measures on the basis of available pertinent information. The Panel thus also found a violation of the requirement under article 2.2 of the SPS Agreement, which requires that a measure be based on scientific principles and not maintained without sufficient scientific evidence.[78] It found that safeguard measures were not indicative of a rational relationship between the measures, which imposed complete prohibitions, and risk assessments, which found no evidence that the particular biotech product presents any greater risk to human health or the environment than its conventional (non-biotech) counterpart. The Panel noted that for each of the products affected by a national safeguard measure, the EC had given its EU-wide approval based on an evaluation of the potential risks to human health and/or the environment. The Panel thus inferred that sufficient scientific evidence was available to permit a risk assessment as required by the SPS Agreement. Consequently, the Panel concluded that the EU member states could not justify their SPS measures under article 5.7, which only applies when relevant scientific evidence is insufficient to conduct an adequate assessment.

The TBT Agreement

Overview

The goal of the TBT Agreement is to preserve the ability of governments and the diverse technical groups to establish necessary standards, while guarding against the unjustified use of standards to protect a domestic industry.[79] Unlike the SPS Agreement, the TBT Agreement will determine the validity of measures, not on the basis of scientific principles or sufficient scientific evidence, but rather on whether such measures are necessary to fulfil a legitimate objective.[80] Legitimate objectives include 'national security requirements, the prevention of deceptive practices, protection of human health or safety, animal or plant life or health, or the environment', and scientific data, while not the only determinant, may be considered in deciding whether a legitimate objective exists.[81]

The TBT Agreement states that signatories cannot discriminate between domestic products and imported products,[82] create 'unnecessary obstacles' to

78 *Ibid.*, paras. 7.3068–7.3399.
79 TBT Agreement, Annex 1(A).
80 *Ibid.*, art. 2.2.
81 *Ibid.*
82 *Ibid.*, arts. 2.1, 5.1.1 & 5.2.1.

international trade though regulation[83] or discriminate among products based on design instead of performance.[84] The Agreement also states that signatories shall make new regulations available to other signatories within a reasonable amount of time, allow comment on regulations, and allow for a reasonable amount of time for compliance.[85] It recognises, however, states' rights to have regulations for the 'protection of human, animal or plant life or health, of the environment', so long as such regulations do not amount to 'arbitrary or unjustifiable discrimination', or a 'disguised restriction to trade'.[86]

Labelling is dealt with under the TBT Agreement as it applies to regulations and standards that regulate the production, processes, packaging, labelling, etc. of both agricultural and industrial products.[87] A regulation is defined in Annex 1.1 as a 'document which lays down product characteristics or their related processes and production methods ... with which compliance is mandatory'. It may also include or deal exclusively with terminology, symbols, packaging, marking or labelling requirements as they apply to a product, process or production method. Thus any mandatory labelling requirement would be considered a technical regulation that falls under the ambit of the TBT Agreement.

To conform to the TBT Agreement, a regulation must meet six legal criteria.[88] Firstly, imported products must be treated no less favourably than 'like' domestic products, and 'like' products from other countries. Secondly, regulations must be no more trade-restrictive than necessary to achieve their objectives. Thirdly, the regulations must be based on international standards, to the extent that they exist or are imminent, unless they would not permit the achievement of the objectives sought. If there is no standard, or the technical regulation in place derogates from it, there is a requirement to notify other members of what the regulation requires. Fourthly, with a view to harmonising measures, countries must recognise other members' measures as technically equivalent, if those measures meet the stated objectives. Fifthly, members shall ensure that all technical regulations adopted are promptly published. Sixthly, members are responsible for ensuring that all subsidiary governments conform to the TBT Agreement if they also set technical regulations.

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83 *Ibid.*, arts. 2.2 & 5.1.2.
84 *Ibid.*, arts. 2.8.
85 *Ibid.*, arts. 2.9, 2.11, 2.12, 5.2.2 & 5.6.
86 *Ibid.*, arts. 2.2.
87 *Ibid.*, art. 1.3, Annex 1.
88 Compton M., 'Applying World Trade Organization rules to genetically modified food', *Pace International Law Report, 15*, 2003, pp. 359–401.

The TBT Agreement in the EC Biotech case

Canada and Argentina claimed that the EU violated article 2.1 of the TBT Agreement, which mandates contracting parties to not discriminate among imported like products in applying their technical regulations, as well as article 2.2, which states that technical regulations may be established for the protection of human, animal and plant life and health, as long as they do not amount to 'unnecessary obstacles to trade'. The Panel did not, however, find it necessary to address the issues raised under the TBT Agreement.

The GATT

Non-discrimination

The main legal principles applying to state parties, as embodied in the GATT are: (i) the most-favoured nation treatment – ie. no discrimination among states;[89] (ii) national treatment – ie. no discrimination between domestic and imported goods;[90] and a prohibition on quantitative restrictions on imports and exports.[91] These legal principles apply *mutatis mutandis* to the trade in GMOs.

Of the two principles, the national treatment principle raises the most complex issues. Article III(4) requires the following:

> The products of the territory of any contracting party imported into the territory of any other contracting party shall be accorded treatment no less favorable than that accorded to like products of national origin in respect of all laws, regulations and requirements affecting their internal sale, offering for sale, purchase, transportation, distribution or use.

This essentially means that laws, rules and regulations must treat like imported and domestic products similarly, and in *Korea – Various Measures on Beef*,[92] the AB explained the three elements of a violation of article III(4):

> For a violation of Article III(4) to be established, three elements must be satisfied: that the imported and domestic products at issue are 'like products'; that the measure at issue is a 'law, regulation, or requirement

89 GATT, art. I, para. 1.

90 *Ibid.*, art. III. This provision requires WTO members to provide equally competitive conditions for imported products as are provided for domestic products. Article III thus aims to guard against protectionism perpetrated through the enactment of measures such as internal taxes or other regulatory measures

91 *Ibid.*, art. XI.

92 WTO, *Korea – Various Measures on Beef*, WT/DS161/AB/R, 10 January 2001, para. 133.

> affecting their internal sale, offering for sale, purchase, transportation, distribution, or use'; and that the imported products are accorded 'less favourable' treatment than that accorded to like domestic products.

Central to the determination of discrimination is thus the issue of likeness, as a law, rule or regulation will only fall foul of article III(4) if it differentiates between *like* products. The question, as far as GMO import regulations are concerned, would be whether imported GM products are considered 'like products' *vis-à-vis* domestic GM products, or *vis-à-vis* domestic non-GM products.[93] In the *Report of the Working Party on Border Tax Adjustments*, the following criteria were established to determine 'likeness':

1. the properties, nature and quality of the products;
2. the end uses of the products;
3. consumers' tastes and habits; and
4. the tariff classification of the products.[94]

In *Japan – Taxes on Alcoholic Beverages* (Japan Alcoholic Beverages case)[95] the WTO AB considered the concept of 'likeness' and observed:

> There can be no precise and absolute definition of what is 'like'. The concept of likeness is a relative one that evokes the image of an accordion. The accordion of 'likeness' stretches and squeezes in different places as different provisions of the WTO Agreement are applied. The width of the accordion in any one of those places must be determined by the particular provision in which the term 'like' is encountered as well as by the context and the circumstances that prevail in any given case to which that provision may apply.[96]

Likeness thus has to be determined 'narrowly' and on a 'case-by-case basis'.[97] In the more recent *European Communities – Measures Affecting Asbestos and Asbestos-Containing Products (EC Asbestos case)*,[98] the AB clarified the application of the four criteria as set out in the Border Tax Adjustment case. The EC Asbestos case

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93 Yu V, 'Compatibility of GMO import regulations with WTO rules', in Brown Weiss E. & J. Jackson (eds), *Reconciling Environment and Trade*. New York: Transnational, 2001, pp. 575–611.

94 WTO, *Report of the Working Party on Border Tax Adjustments*, 2 December 1970, GATT Doc. L/3464, BISD 18th Supp. 97, para. 18.

95 WTO, *Japan – Taxes on Alcoholic Beverages*, WT/DS11/AB/R, 4 October 1996.

96 *Ibid.*, para. 16.

97 *Ibid.*, para. 15.

98 WTO, *European Communities – Measures Affecting Asbestos and Asbestos-Containing Products*, WT/DS135/AB/R, 12 March 2001. The case involved a Canadian challenge to the French ban on asbestos and asbestos-containing products on the basis that the ban adversely affected the trade of such products in violation of, among other provisions, art. III(4) of the GATT.

is particularly relevant to a 'like products' analysis of GMOs and conventional foods, because the nature of the dispute in this case similarly involves a trade measure enacted for the purported purpose of protecting against a perceived human health risk.[99] The AB determined that chrysotile asbestos fibres, and PVA, cellulose and glass (PCG) fibres are not 'like products', and explained that the application of the abovementioned four criteria varies on a case-by-case basis, but is guided by the goal of preventing trade protectionism and ensuring equality of competitive conditions in the marketplace.[100] The greater the similarities of two products in the marketplace, the higher the probability that they will be deemed 'like products'.[101] Market competitiveness and substitutability are most reflected in the end-uses and consumer-tastes criteria. The majority of the AB found that market substitutability is a necessary and sufficient condition for finding likeness, whereas the concurring member of the AB was willing to find that chrysotile fibres are not like PCG fibres, based on the stark and established differences in health risk alone, despite a clear finding of a competitive relationship.[102]

In probing the properties of the products, the AB held that the examination of the physical properties of a product need not end at its physical characteristics, but rather can include the consequences that flow from those physical characteristics.[103] Significant for the GMO issue is the fact that the AB determined that molecular structure and chemical composition were relevant factors in the analysis of the physical properties of the chrysotile fibres, as those factors affected the fibre's carcinogenicity.[104] In other words, it is possible to distinguish a GMO product whose molecular structure has been altered through the introduction of new genetic material, especially in light of the consequences that may flow from such alteration.

In analysing the third criterion, ie. consumer taste and habits, the AB considered that evidence relating to consumer tastes could establish that the health risks associated with chrysotile fibres influence consumer behaviour towards the different products at issue, and hence provide a vital distinction between the two products.[105] Thus, should customers hold the opinion that GM food poses a health risk and as a result purchase conventional foods, for example, it could support a lack of likeness between the two products. However,

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99 Wong J., 'Are biotech crops and conventional crops like products? An analysis under GATT', *Duke Law & Technology Review*, 2003, p. 127.
100 EC Asbestos case, paras. 97–99.
101 *Ibid.*, para. 99.
102 Wong J., *op. cit.*, p. 19.
103 EC Asbestos case, para. 113.
104 *Ibid.*, para. 114.
105 *Ibid.*, para. 122.

it has been suggested that 'where a government imposes a ban on a product, purportedly on the grounds of health risks that were generally not known to most consumers, the result is that the consumers have no choice but to seek an alternative product.'[106]

A finding that GM food is like other food could still, however, lead to an exception being raised, and a contracting party may adopt a measure to exclude a product on the basis that such a measure is ' necessary to protect human, animal or plant life or health'. Such a measure may be protected in terms of article XX of the GATT, which provides for some exceptions to general trade rules.

Article XX exceptions

Article XX of the GATT creates a number of general exceptions to the trade rules embodied in the Agreement. It states:

> Subject to the requirement that such measures are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade, nothing in this Agreement shall be construed to prevent the adoption or enforcement by any contracting party of measures:
>
> (*b*) necessary to protect human, animal or plant life or health; ...
>
> (*g*) relating to the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption.

In reviewing the structure of article XX, it is clear that it consists of two parts: firstly an introductory clause, also known as the *chapeau*, and secondly, a list of measures that fall within its scope. Highlighted above are the measures pertaining to measures falling within the scope of environmental and health exceptions. The jurisprudence on these two exceptions has evolved over time. The WTO AB has now taken the position that a proper analysis of an article XX defence is a two-step process that involves, in the first instance, a consideration of whether the measure is an issue that is covered by article XX, and secondly whether the measure complies with the *chapeau*.[107]

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106 Wong J., *op. cit.*, p. 23.

107 See for example, WTO, *United States – Reformulated Gasoline*, WT/DS2/AB/R, adopted 20 May 1996, and *United States – Import Prohibition on Certain Shrimp and Shrimp Products*, WT/DS58/AB/R, adopted 12 October 1998 (US Shrimp case).

Any measure that restricts the import of GMOs will have to meet the following three criteria as it relates to article XX (b) or (g). Firstly, it needs to be determined whether the policy in respect of which these provisions were invoked fell within the range of policies referred to in these provisions, ie policies to protect human, animal or plant life or health; secondly, it has to be determined whether the measure for which the exception was invoked was *necessary* to protect human, animal or plant life or health; and thirdly, it has to be determined whether the measure was applied in a manner consistent with the *chapeau* of article XX, namely that it should not be 'applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade.'[108]

The first requirement would revolve around the issue of whether the restrictive GMO measure is aimed at protecting human, animal or plant life or health, or aimed at protecting natural resources. Thus, if it is a measure that was imposed for ethical or social reasons, it would fail the first requirement.[109] Similarly, mandatory labelling or mandatory public notification requirements would also fall foul of this first requirement if they are based on non-scientific grounds[110] and if they are applied only to assuage the ethical objections of consumers. The second requirement may prove to be the more challenging. 'Necessary' has been linked to the question of the existence of alternative options that would achieve the same objections, but without having the same trade-restrictive impact.[111] Thus, the measure restricting the importation of GMOs will have to be the only measure available to protect human, animal or plant life or health, or natural resources. Finally, while a GMO restriction may pass the first two hurdles and thus be considered as an allowed exception, it will still have to comply with the chapeau, which essentially requires that a measure must not amount to: (a) 'arbitrary discrimination between countries where the same conditions prevail'; (b) 'unjustified discrimination between countries where the same conditions prevail'; or (c) a 'disguised restriction on international trade'. A measure that applies equally to all importing countries and to both domestic and imported products will pass muster under (a) and (b),[112] but proving that a

108 WTO, *United States – Restrictions on Imports of Tuna*, DS29/R, 16 June 1994.
109 Yu J., *op. cit.*, p. 617.
110 *Ibid.*
111 WTO, *Thailand – Restrictions on Importation of and Internal Taxes on Cigarettes*, DS10/R, adopted 7 November 1990, para. 7.
112 US Shrimp case, where the AB found a disparity in phase-in periods and technology transfer to adopt turtle-excluding devices (paras. 163–165).

GMO measure does not amount to a disguised restriction on trade may prove to be more taxing.

The GATT in the EC Biotech case

Both Canada and Argentina raised a violation of article III(4) in their complaints against the EU in the EC Biotech case. Both complainants argued that domestically grown non-biotech products are like products to GM products,[113] while the EU argued that domestic GM products are the like products.[114] In determining whether the moratorium amounts to a law in accordance with article III(4), the EU argued that it was not present in any official document and as such that only the national moratorium is covered by article III(4), while the moratorum must be considered in terms of issues related to possible delays in the application of a legitimate procedure.[115] Finally, in determining whether the measure amounted to unequal treatment, the complainants argued that this is indeed the case, as domestically grown GM products do not have to be authorised to be placed on the market, while the EU alleged that the same authorisation process is followed for domestic GM products.[116] The Panel did not, however, find it necessary to rule on article III(4).

Conclusion

The WTO regulatory framework that applies to GMOs is extensive. However, many of the substantive issues were not addressed in the EC Biotech case. The Panel made it clear that it had not addressed the issue of 'whether biotech products in general are safe or not.' It also did not address the challenges under the GATT or TBT Agreement, and specifically the all-important issue of 'whether the biotech products at issue in the dispute are "like" their conventional counterparts.' The Panel also did not address the question of whether the EU product-by-product approval procedures were consistent with EU obligations under the WTO agreements. Since the Panel only found violations that relate to the procedural requirement not to cause 'undue delay', current EU regulations relating to biotech products remain unaffected.[117]

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113 WTO, *First Written Submission of Canada*, heading VII.B.1.b and *First Written Submission of Argentina*, heading III.a.

114 WTO, *First Written Submission by the European Communities*, secs. 536 & 634.

115 *Ibid.*, secs. 522–526 & 627.

116 *Ibid.*, secs. 527–532 & 627.

117 CIEL, 'Analysis of the Biotech case', available at http://www.ciel.org, accessed 20 February 2006.

The Panel's decision does, however, affect the national bans or safeguard measures. Since the Panel concluded that none of the EU member states conducted an assessment of risk in line with the requirements of the SPS Agreement, it is unclear whether it will be possible for EU member states to maintain their current prohibitions and come into conformance with the SPS Agreement (eg. by conducting new risk assessments and basing their measures thereon).[118] The decision lays down the principles, however, that countries may no longer exclude GMOs without a proper assessment of risk, and that a precautionary approach will violate trade rules if an evaluation of the potential risks to human health and/or the environment has in fact been conducted.

REGULATION OF INTERNATIONAL TRADE IN GMOS UNDER INTERNATIONAL ENVIRONMENTAL LAW

The relevance of other rules of public international law to the interpretation of WTO agreements

In the EC Biotech case the EU made the argument that in line with the US Gasoline case decision, WTO agreements should not be read in clinical isolation from public international law. It argued that legal issues concerning the authorisation and international trade of GMOs are not exclusively regulated by WTO law.[119] In particular, the provisions of the Convention on Biodiversity[120] and the Cartagena Protocol on Biosafety[121] to the Convention on Biodiversity deal with the trade in GMOs, and the EU argued that the provisions of the Cartagena Protocol regarding precaution and risk assessment should be read in conjunction with those of the SPS Agreement, and that the Cartagena provisions in fact inform the SPS Agreement in this regard.

The relevant provisions of the Cartagena Protocol

The Cartagena Protocol on Biosafety was adopted on 29 January 2000. In terms of article 1, the aim of the Protocol is

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118 *Ibid.*

119 EC Biotech case, para. 7.65.

120 UN Conference on Environment and Development, Convention on Biological Diversity, 5 June 1992 (entered into force 29 December 1993), UNEP/Bio.Div./CONF/L.2, available at http://www.biodiv.org, accessed 1 February 2006.

121 UN, *Cartagena Protocol on Biosafety*, 29 January 2000 (entered into force 11 September 2003), UNEP/CBD/ExCop/1/3, available at http://www.biodiv.org/biosafe, accessed 1 February 2006.

> to contribute to ensuring an adequate level of protection in the field of safe transfer, handling and use of living modified organisms resulting from modern biotechnology that may have adverse affect on the conservation and sustainable use of biological diversity, taking also into account risks to human health and specifically focusing on transboundary movement.

Member obligations are twofold: (1) to implement the Protocol domestically; and (2) to ensure that they reduce the risks of LMOs to biodiversity and human health in accordance with the Protocol.[122] The Protocol provides for risk assessments, which have to be undertaken in a 'scientifically sound manner'[123] and according to international guidelines.[124] Socio-economic considerations such as consumer preference or food security are not specifically included in the risk assessment procedure. Articles 10(6) and 11(8) allow importing member states to take a precautionary approach in their decision-making when importing GMOs for deliberate release into the environment or for direct use as food or feed. Article 10(6), for example, states:

> Lack of scientific certainty due to insufficient relevant scientific information and knowledge regarding the extent of the potential adverse effects of a living modified organism on the conservation and sustainable use of biological diversity in the Party of import, taking also into account risks to human health, shall not prevent that Party from taking a decision, as appropriate, with regard to the import of the living modified organism in question as referred to in paragraph 3 above, in order to avoid or minimize such potential adverse effects.

Although the Protocol allows for a review of decisions, unlike the SPS Agreement, precautionary provisions in the Protocol are not premised on the need to obtain additional information for a more 'objective assessment of risk', and they also do not require that a review be concluded 'within a reasonable period of time'.

The Panel's analysis

The Panel acknowledges that pursuant to article 3.2 of the Dispute Settlement Understanding, there is a requirement to interpret the WTO agreements 'in accordance with customary rules of interpretation of public international law'

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122 Cartagena Protocol, arts. 2.1 & 2.2.

123 *Ibid.*, art. 10.

124 Annex III sets out the conditions for risk assessment. Pursuant to art. 6, the notifier bears the cost of the risk assessment.

as reflected in the Vienna Convention on the Law of Treaties, but notes that it is only those international rules that are 'applicable in the relations between the parties that should be taken into account'. It is only those international agreements, however, that have been signed and ratified by *all* the parties that would be 'applicable in the relations between the parties'.[125]

With respect to the CBD, the Panel notes that all the parties, with the exception of the US, have signed and ratified the convention. The US has signed, but not ratified it. As such, the CBD cannot be considered as an international agreement 'applicable in the relations between the parties'.[126] The Cartagena Protocol, according to the Panel, can similarly not be viewed as 'applicable in the relations between the parties', as it is only the EU that has signed and ratified it. Canada and Argentina have signed but not ratified it, while the US has not signed it.[127]

The Panel did, however, consider the precautionary principle as a 'general principle of international law'. In assessing the status of the precautionary principle in international law, the Panel refers to the EC Beef Hormones case, where the AB observed that uncertainties remain regarding the precise definition and content of the precautionary principle, and that some scepticism existed as to whether the precautionary principle has indeed reached the status of a 'general principle in international law'. As a result, the Panel elected not to deal with the issue.[128]

REGULATION OF INTERNATIONAL TRADE IN GMOS IN AFRICA

African Model Law on Biosafety

The most significant development in the area of the regulation of GMOs in Africa has been the development of the African Model Law on Safety in Biotechnology. Commissioned by the AU, the Model Law is an attempt to provide an instrument that can be used by member states in the development of their own biosafety legislation, in line with their obligations to implement the Cartagena Protocol.[129] It is also an attempt to develop a co-ordinated regional approach to biosafety in light of the cross-boundary effect of LMOs.[130]

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125 EC Biotech case, para. 7.71.
126 *Ibid.*, para. 7.74.
127 *Ibid*, para. 7.75.
128 EC Beef Hormones case, para. 7.89.
129 See AU, *Report of the Interim Chairperson on the Africa-wide Capacity Building in Biosafety*, EX/CL/31, 4–8 July 2003, para. 4.
130 *Ibid.*

While the Model Law is to a large extent framed along the lines of the Cartagena Protocol, it seemingly also has the goal of addressing African concerns and circumstances.

Broader in scope than the Cartagena Protocol, the Model Law applies to all GMOs, including those intended for release into the environment, for pharmaceutical purposes, for food, and for feed or processing, and derivates of GMOs.[131] The Cartagena Protocol explicitly excludes derivatives of GMOs and GMOs designed for pharmaceutical purposes.

Risk assessment is broadly defined and includes the

> evaluation of the direct and indirect, short, medium and long term risk to the environment, biological diversity or human health, including socio-economic conditions or to ethical values arising from the contained use, release or placing on the market of a genetically modified organism or of a product of a genetically modified organism.[132]

Risk management is a specific requirement and provides for measures such as accident containment strategies, observation periods, prohibitions, cessation of risk-bearing or unauthorised activities, and periodic reporting in respect of the monitoring and evaluation of risks carried out after the approval of the import, contained use, release or placing of GMOs on the market. Other risk management procedures include traceability and mandatory labelling,[133] and liability and redress for harm caused by GMOs to human health, biodiversity or the environment.[134] The Model Law also addresses liability and redress for specific African and food-security-related concerns such as economic, social and cultural conditions, livelihood and indigenous knowledge systems.[135]

The Model Law attempts to provide a sample regulatory system for biosafety that can be adopted by individual African countries to suit their own individual needs. Based on the Cartagena Protocol, it sets up a rather strict regulatory system, and, as will be noted below, many African countries have considered the Model Law in developing their own policies and laws on biosafety. At an executive council meeting during the third ordinary session of the AU[136] it was reported that the organisation has initiated a regional programme for capacity building in biosafety in Africa. The programme consists of: the development of

131 *Ibid.*, art. 2.
132 *Ibid.*, arts. 1 & 8(2).
133 *Ibid.*, art. 11.
134 *Ibid.*, art. 14.
135 *Ibid.*
136 *Ibid.*, sec. III.

technical papers, handbooks and information kits on biosafety; the establishment of an analytical pilot laboratory in Africa for GMOs and the strengthening, in a second phase, of existing institutions in Africa in the field; assistance for the formulation of national laws on biosafety; and training in risk assessment and management of biosafety.

GMO REGULATION WITHIN SADC

Introduction

SADC consists of 14 member states: Angola, Botswana, the Democratic Republic of the Congo (DRC), Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe. Of the 14 countries, only South Africa has commercialised GM crops. This makes South Africa the only country within the sub-region that not only has an interest in GM regulation as an importing country, but also as an exporting country.

At a SADC meeting in September 2003, the 14 SADC nations agreed on common guidelines on how to handle GMOs.[137] They agreed that the region should develop a common biosafety policy and regulatory system based on either the Cartagena Protocol or the Model Law by 2004. It was also agreed that member states should establish national biosafety regulatory policies and systems, and sign and ratify the Cartagena Protocol.[138] In 2004 SADC adopted a set of recommendations made by its advisory committee on biotechnology and biosafety. The recommendations included the development of a harmonised transit information and management system for genetically engineered food aid and the requirement that genetically engineered food aid in transit be clearly identified and labeled in accordance with national legislation.[139]

Within SADC, quite a few countries are in the process of developing national legislation. (see the Annex to this chapter). There are, however, some differences in the approach that has been taken. It is evident that some countries have largely been guided by the provisions of the Cartagena Protocol. Others seemed to have adopted a more-stringent approach, one that is closer aligned with the approach adopted in the Model Law. In assisting African countries with the development of

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137 SciDeve.Net, *Southern African Nations Adopt Common GM Strategy*, 15 September 2003, available at http://www.Scidev.net/News/, accessed 6 December 2005.

138 *Ibid.*

139 Greenpeace, *Trailing behind the Pack*, 2005, p. 6, available at http://www.greenpeace.org/canada//e/campaign/gmo/documents/Trailing.pdf, accessed 29 January 2006.

domestic regulation, several projects are being funded by foreign institutions and countries. Individual EU member states, such as Germany, have provided support. The US, through the US Agency for International Development, is funding the Southern African Biotechnology Programme, which aims at building a regional policy and a technical capacity in the application of modern biotechnology. Other regional initiatives include the East African Regional Programme and Research Network for Biotechnology, Biosafety and Biotechnology Policy Development; and the Association to Strengthen Agricultural Research in East and Central Africa.[140]

The implications of the EC Biotech case for SADC countries

In adopting national regulations, it is significant that the majority of SADC countries have either signed or signed and ratified the Cartagena Protocol. As members of the Protocol, these countries are expected to adopt laws and regulations that would implement its provisions. In line with this obligation, SADC countries will, therefore, have to draft or amend their laws in line with these obligations. South Africa is already in the process of doing so. The challenge is, however, to do so while at the same time not offending the rules of WTO agreements. Possible conflicts between the provisions of multilateral environmental agreements such as the Biosafety Protocol and WTO agreements remain unclear.

In juxtaposing the two international frameworks, it is clear that the two regimes attempt to achieve diagonally opposed aims. The trade regulatory framework is designed to ensure market access of goods and services that is unfettered by restrictions on trade or unduly discriminates among contracting parties. While countries are allowed to restrict trade under certain conditions, including restrictions aimed at protecting natural resources or human, animal and plant health or safety, they may do so only under very strict conditions, and any regulation restricting the import of GMOs will thus have to pass this strict test. Environmental regulation of GMOs takes a more cautious (and at times precautionary) approach to the trade in GMOs and sets out clear rules for risk assessment and risk management. The Cartagena Protocol aims to protect the environment – and specifically biodiversity – against any adverse consequences that may flow from uncontrolled and/or negligent introduction of GMOs to the natural environment. Some also argue that the Cartegena Protocol aims to protect human health and thus regulates food safety.

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140 *Ibid.*

As a result of these diverging aims, stark differences in regulatory approaches naturally arise. For example, while the precautionary approach is promoted in the Cartagena Protocol, it is strongly discouraged in the multilateral trade regime, and the SPS Agreement – the only agreement referring to the precautionary approach – limits its use rather substantially. Secondly, while the Cartagena Protocol requires risk assessment as part of the risk management considerations, risk assessment in the SPS Agreement is dealt with only as a minimum requirement for the exclusion of a product from the domestic market. Thirdly, it is not clear what regime the Cartagena Protocol will adopt on documentation and labelling. However, under any mandatory labelling requirement, labels that mandate the disclosure of the method of production of biotechnology-derived foods or ingredients would most likely fall foul of WTO requirements, as international trade rules do no distinguish between products on the basis of process considerations. Similarly, any label that requires an indication as to whether any GM material is used at any time in the production process may be challenged, as WTO rules are based on the notion that GM products are not like products to conventional foods.

The Panel in the EC Biotech case has acknowledged that, in the interpretation of WTO agreements, it must have regard for relevant rules of international law, including other treaties and agreements dealing with the same subject matter. It has noted, however, that it is only those international rules that are applicable in the relations between the parties that should be taken into account and that it is only those international agreements that have been signed and ratified by *all* the parties that would be 'applicable in the relations between the parties'. This was not the case in the EC Biotech case, and, as such, the Panel did not find it necessary to address the matter.

Another area of concern is the practice of banning imports of GMOs. At present, some SADC members have imposed bans on GMOs destined as food aid, while others have marketing bans on the importation of GMOs. The EC Biotech case Panel had to establish whether a delay on the approval of GMOs for marketing amounted to an SPS measure as defined in the SPS Agreement. In this regard, it distinguished between a ban on the one hand and the EU moratorium on the other. With respect to the latter, it concluded that it falls outside the definition of SPS measures as set out in the second paragraph of Annex A(1), which provides that: 'Sanitary and phytosanitary measures include all relevant laws, decrees, regulations, requirements and procedures'. The moratorium as applied by the EU is a procedural mechanism and not a procedure as referred to in the above definition. As regards a ban, the Panel noted that Annex A(1) does not prescribe a specific legal form and that SPS measures may in principle take many legal

forms, including a ban on the marketing of a product.[141] This suggests that an outright marketing ban on GMOs could be considered an 'SPS measure' as defined by Annex A(1) of the SPS Agreement, and, as such, it would have to adhere to the requirements of the SPS Agreement. This includes the requirement that the measure must be based on a risk assessment. It is not clear whether existing SADC measures are based on risk assessments.

CONCLUSION

It has been argued that the fundamental legal and philosophical differences between the US and the EU on the issue of biotechnology would eventually prompt a situation that could ultimately become a full-scale trade war, and that African countries will be forced to choose between the two powerhouses. The real harm resulting from this conflict will thus fall upon these countries that lack the economic and political standing necessary to take a strong position on the trade and environmental issues at stake.[142]

This is clearly illustrated in the Southern African region and the knee-jerk response adopted by a number of countries faced with food security crises. The number of bans on unmilled GM food aid is most likely a reflection of the fact that Europe remains Africa's strongest trading partner, and, as such, there is a real fear that GM seeds may become co-mingled with conventional seeds or that they may be planted by farmers who are not aware of the nature of the seeds or the strict regulatory requirements set by European trading partners. Concerned that the EU may deny access to GM-contaminated crops, these countries thus refused food aid offered by the US to help eliminate food shortages. This response is also evidence of a reactive rather than a proactive response not only to biotechnology, but also to trade considerations. In analysing the policy approaches of SADC countries, it seems as if they predominantly align themselves with the EU approach. This is done indirectly through the signing and ratification of the Cartagena Protocol, an agreement that was strongly pushed by the EU. Where countries have adopted laws or draft laws they have opted to abide by the minimum standards for biosafety as set out in the Cartagena Protocol, in some instances regulation surpasses the Protocol. This is in line with the approach adopted by the EU and in some respects that of the African Model Law.

The question is whether the above approach by SADC countries would amount

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141 *Interim Report*, para. 7.1327.

142 McDonald M.K., 'International trade law and the US–EU GMO debate: Can Africa weather this storm?', *Georgia Journal of International & Comparative Law*, 32, 2004, pp. 501–5.

to a violation of their obligations. The EU takes the position that its regulatory regime not only complies with international environmental law; it is also in line with international trade rules. This is contested by the US, notorious for not signing international environmental agreements.

It was generally expected that the EC Biotech case would provide a clear indication of the status of GMOs under international trade rules. However, the Panel declined to rule on the myriad of legal arguments proffered by the complainants, and the main points of contention between the US and the EU remain unclear.

SADC countries may in the meantime profit from addressing biotechnology concerns by reflecting on their own interests and needs. While the argument is made that GMOs may be a powerful tool in the fight against food insecurity, the question remains: to what extent is current GM science geared toward alleviating poverty and hunger and available to poor farmers and consumers? There is a real possibility for the development of 'biotechnology for food security' through interventions such as public–private partnerships, training of African scientists, transfer of technology and liberal intellectual property approaches, provided these take place within the proper regulatory framework that takes cognisance of associated risk to human health and the environment.

Annex: Overview of policy and regulation of GMOs in SADC

Country	Cartagena Protocol	Policy decisions	Regulation	Risk assessment	Mandatory labelling
Angola	Not signed	GM ban (March/ April 2004); accept milled food only	None		
Botswana	Signed and ratified		Developing a framework on biosafety (not in the public domain)	Unknown	Unknown
DRC	Signed				
Lesotho	Signed and ratified	Requires milling before distribution	Developing a biosafety bill	Yes	No
Madagascar	Signed and ratified		None		
Malawi	Signed	Ban on importing unmilled GM food aid since 2002	Biosafety Act 2000	Only in some instances	Yes
Mauritius	Signed and ratified		Biosafety Law No. XLIV of 2003	Yes	Yes
Mozambique	Signed and ratified	Ban on importing unmilled GM food aid	None		
Namibia	Signed	Ban on importing unmilled GM food aid	Developing a biosafety framework		
Seychelles	Signed and ratified				
South Africa	Signed and ratified		GMO Act 1997 and GMO Amendment Act 2005	Yes	Yes
Swaziland	Not signed	Ban on importing unmilled GM food aid	Biosafety Act	Yes, sometimes	Yes
Tanzania	Signed and ratified		National Biosafety Guidelines	Yes	Yes, but non-mandatory
Zambia	Signed and ratified	Ban on GMOs	National Biosafety Framework	Yes	No
Zimbabwe	Signed and ratified	Ban on importing unmilled GM food aid	Biosafety Regulations 1999	Unknown	Unknown

Chapter 5

The Cartagena Protocol on Biosafety: Negotiating Positions and Challenges

George Naphambo[1]

INTRODUCTION

The Cartagena Protocol on Biosafety[2] was adopted by the Conference of the Parties (COP) to the Convention on Biological Diversity and entered into force on 11 September 2003. It is a legally binding international instrument whose objective is to protect biological diversity from the potential risks posed by LMOs (generally known as GMOs). It seeks to achieve this by, among other things, establishing requirements for the handling, packaging, transportation and identification of LMOs, as well as by providing for the establishment of a liability and redress regime for damage caused by LMOs.[3]

However, during the negotiations of the Cartagena Protocol, the negotiators were unable to agree on the specifics of a liability regime under the Protocol. So at the first meeting of the COP serving as the Meeting of the Parties to the Protocol (COP-MOP1), which took place on 23–27 February 2004 in Kuala Lumpur, Malaysia, it was decided to establish an Open-Ended Working Group of Legal and Technical Experts on Liability and Redress that would look at the different options for rules and procedures for liability and redress. The Working Group had its first meeting in March 2005 and recommended certain options that were to be presented to the COP-MOP for further negotiation in March 2006.[4] These options include the definition and nature of damage, the valuation of damage to biodiversity and to human health, the threshold of damage, causation, the channeling of liability, the roles of parties of import and export, the standard of liability, mechanisms of financial security and the right to bring claims.

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1 GEORGE NAPHAMBO was an Intern in the Development Through Trade Programme at SAIIA in 2005.

2 The full text of the Cartagena Protocol is available at http://www.biodiv.org/biosafety/protocol.asp.

3 Under arts. 18 & 27 of the Cartagena Protocol, respectively.

4 See UNEP/CBD, Report of the Technical Group of Experts on Liability and Redress in the Context of the Cartagena Protocol on Biosafety, UNEP/CBD/BS/WG-L&R/1/2-UNEP/CBD/COP-MOP/2/INF/5, available at http://www.biodiv.org/doc/meetings/bs/bswglr-01/official/bswglr-01-02-en.pdf.

Another Working Group of Technical Experts[5] was also formed at COP-MOP1 that was to look into the proposals for requirements for the identification of LMOs intended for direct use as food, feed and processing (LMO-FFPs) under article 18(2)a of the Cartagena Protocol. Currently, this article provides that any transboundary movement of LMO-FFPs has to be labelled as 'may contain' LMOs and it mandates COP-MOP to establish detailed requirements for identification that could include documentation. It further states that a contact point for more details about the LMO should be provided. At its first meeting, which took place on 16–18 March 2005 in Montreal, Canada, the Working Group produced a report that was debated at the second meeting of COP-MOP in March 2005 (COP-MOP2). However, parties at COP-MOP2 were unable to come up with detailed documentation/identification requirements for LMO-FFPs. These requirements were to be discussed at COP-MOP3, which was to take place in Brazil on 13–17 March 2006, and the discussions were to be based on the recommendations of the Working Group.[6]

This paper looks at the different options for negotiations in the liability regime debate and the debate on labelling of LMO-FFPs. It also looks at the different positions taken by different negotiators, ranging from developed countries through developing countries, developers of LMOs and civil society. It gives an explanation of the legal issues involved in both debates and the feasibility of the options from a legal perspective. It particularly looks at the potential implications for African states once they choose a particular negotiating position.

Some of the views on liability and redress have been sourced from a workshop organised by the South African Department of Environmental Affairs and Tourism on 1–2 November 2005, where African representatives gathered together with industry and civil society and discussed the options presented by the Working Group. Industry at the workshop was represented by Monsanto and Sygenta. However, at COP and any other meetings under the Cartagena Protocol, industry was represented by the International Grain Trade Coalition (IGTC)[7] and the Global Industry Coalition (GIC).[8] These parties were specifically asked to make

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5 UNEP/CBD, *Report of the Open-Ended Technical Expert Group on Identification Requirements of Living Modified Organisms Intended for Food or Feed or for Processing*, UNEP/CBD/BS/COP-MOP/2/11, available at http://www.biodiv.org/doc/meetings/bs/mop-02/official/mop-02-11-en.pdf.

6 This chapter was written before any details emerged from the COP-MOP3 meeting.

7 The IGTC was formed in June 2001 and currently includes 17 trade organisations in 10 countries that in turn represent more than 2,500 members in more than 80 countries that are involved in importing and/or exporting, or food, feed and industrial processing.

8 The GIC represents over 2,200 firms in 130 countries worldwide. Its membership includes companies from a variety of industry sectors, including plant and animal agriculture, food

contributions, as they are responsible for the actual movement or transportation of LMOs and have experience in adhering to regulations relating to the latter's trans-boundary movement. Their views were not binding, but had persuasive value and were usually taken into account. Membership of the two groups overlapped at times. Finally, it is to be noted that the EU does not believe in the establishment of a liability regime in the form that other states such as African states are proposing, and as such it remains for the African Group to push for this agenda in the negotiations, should they feel inclined to have such a liability regime.[9] The EU has raised certain issues, the most-important one being that the liability regime as it is currently being negotiated is not in line with traditional EU environmental laws of liability.[10][11]

ISSUES CONCERNING THE PACKAGING, HANDLING, TRANSPORTATION AND IDENTIFICATION DEBATE

Introduction

As mentioned above, the Working Group on Liability and Redress provided a list of options for the identification of LMO-FFPs to be debated and adopted as requirements. The main issues included the documentation accompanying LMO-FFPs, the statement or elements of a statement, contact information, information on the LMOs, the extent and modality of using unique identifiers, thresholds for approved LMOs, thresholds for unapproved LMOs, and harmonisation of sampling and detection techniques. These issues and the options under them are now examined in detail.

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production, human and animal health care, and the environment.

9 It worth noting that a strict liability regime comes with serious resource-intensive burdens and is contrary to facilitating trade. It is small businesses and poor countries that suffer the most from such a regime. Seen in this light, an overly strict regime may not be in Africa's long-term development interest.

10 See UNEP/CBD, *Liability and Redress for Damage Resulting from The Transboundary Movements of Living Modified Organisms: Review of Existing Relevant Instruments and Identification of Elements*, UNEP/CBD/ICCP/2/3, para. 77, available at http://www.biodiv.org/doc/meetings/bs/iccp-02/official/iccp-02-03-en.pdf.

11 See UNEP/CBD, *Liability and Redress for Damage Resulting from The Transboundary Movements of Living Modified Organisms: Review of Existing Relevant Instruments and Identification of Elements*, UNEP/CBD/ICCP/2/3, para. 77, available at http://www.biodiv.org/doc/meetings/bs/iccp-02/official/iccp-02-03-en.pdf.

Documentation accompanying LMO-FFPs

Article 18(2)a of the Cartagena Protocol requires that the documents accompanying an LMO should state that a shipment 'may contain' LMOs. The negotiators debated as to whether this meant that such a clause should either be in a commercial invoice that normally accompanies any kind of shipment, or be a stand-alone document that was specifically designed for this purpose, or be among other documents required or utilised by existing documentation systems.[12]

In submissions made by countries, most parties preferred the use of commercial invoices or already existing documentation systems. For instance, Australia argued that it already requires a number of documents such as bills of lading, sanitary and phytosanitary certificates, certificates of origin and always a commercial invoice whenever any party wants to import grain, and that this is enough to convey information requirements set down by the text of the Cartagena Protocol for LMO-FFPs.[13]

Some countries, such as India, supported a stand-alone document on the grounds that authorities responsible for biosafety do not have control over commercial invoices, nor were such invoices under the supervision of the Protocol, but suggested that they were willing to consider the existing documentation system if it included the identification requirements of LMO-FFPs.[14]

Subsequently, COP-MOP1 decided that parties should either use the commercial invoice or existing documentation system.[15] The commercial invoice is probably the best option because the document is required in most countries in commodity shipments and the documentation system is used internationally, not just between parties, while port officials are familiar with the commercial invoice. In addition to this, coming up with a new documentation system would mean extra costs and would take additional time to develop. Furthermore, it is supported by COP-MOP.

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12 UNEP/CBD, *Synthesis of Information and Views Regarding Identification Requirements for Living Modified Organisms Intended for Direct Use as Food, Feed or for Processing*, UNEP/CBD/BS/OETEG-HTPI/1/2, para. 2(a), art. 18, available at http://www.biodiv.org/doc/meetings/bs/bstegir-01/official/bstegir-01-02-en.pdf.

13 UNEP/CBD, *Handling, Transport, Packaging and Identification (Article 18): Compilation of Views and Relevant Information on Paragraph 2(a) of Article 18 of the Cartagena Protocol on Biosafety*, UNEP/CBD/BS/OETEG-HTPI/1/INF/1, available at http://www.biodiv.org/doc/meetings/bs/bstegir-01/information/bstegir-01-inf-01-en.pdf.

14 *Ibid.*, para. 2.5.

15 See COP-MOP1, Decision BS-1/6, para. 1, available at http://www.biodiv.org/decisions/default.aspx?m=MOP-01&id=8288&lg=0.

Information provided in the accompanying documentation

This issue relates to the statement or elements of a statement, contact information and information on the LMOs.

Statement or elements of a statement

This issue deals with the kind of statement that will embody the requirements set in article 18(2)a. Whereas the previous issue dealt with what kind of document should be used, the present issue concerns what should go into the document. Three options were up for debate with regard to how the statement could read (the first two give the actual wording put forward; the third gives a suggestion as to what the content should cover):

1. This shipment may contain LMOs intended for direct use as food or feed, or for processing, that are not intended for intentional introduction into the environment.[16]
2. This shipment contains living modified organisms intended for direct use as food or feed, or for processing, that are not intended for intentional introduction into the environment.
3. There should be a clear identification that the shipment contains living modified organisms.

Industry and parties that have commercialised LMOs and that allow them to be grown freely in their territories supported option 1 for a number of reasons. One of them stated that the term 'may contain' is not designed to be a tool for risk assessment. Therefore, importing parties can decide whether or not they should do any risk assessment. However, if the documentation requires that the clause should read 'contains LMOs', parties will feel obliged to undertake a risk assessment. Also, if it is required that shipments of LMOs should have 'contains LMO' in the documentation, parties will base their decisions regarding whether to import or not on this phrase, which could prejudice LMO exporters. However, if the language is 'may contain', parties will base their decisions to import on other considerations. Another advantage of the 'may contain' language is that shipments that contain non-LMOs but become contaminated will be covered, and thus one cannot be blamed for providing false information later.

16 This is the Cartagena Protocol provision.

On the other hand, some parties prefer to use 'contains LMOs', notably for shipments that do indeed contain LMO-FFPs. These parties are groups such as the EU and Sri Lanka. They support and encourage adoption of the proposal by COP-MOP1 that where parties know as a matter of fact that the shipment does contain LMO-FFPs, then such parties should declare that it 'contains LMOs', even though the Cartagena Protocol provides for the phrase 'may contain LMOs'.

Another proposal by the New Zealand Institute for Gene Ecology[17] stated that the phrase 'contains LMO' should be supported on the grounds that this would relieve the importing country of the burdensome task of having to monitor and detect LMOs in its imports, as the burden of proof would lie with the exporting country to prove that the shipment does not contain any LMOs. Thus, all shipments would be presumed to contain LMOs until proven otherwise by the exporting country.

Contact information

Article 18(2)a states that once the documentation contains the 'may contain' phrase, a contact point should also be mentioned where further information about the LMO can be found or supplied. Here there were three options as to the content of this feature:

1. the details of the last exporter and the first importer;
2. the details of the exporter, the importer or any appropriate authority designated by government as a contact point for further information; or
3. the contact point for further information, including the name and address of the consignee.

Canada supported the first option, as the first importer has the contact information of the last exporter, and the last exporter obtains the necessary information related to the LMO or the last exporter knows how to obtain the necessary information.

The EU supported option 2, as this was in line with the EU's laws regulating the import of LMOs. Japan also supported option 2, on the same grounds as the EU. However, it specified the information that had to be given when identifying the contact point, eg. the name, address and contact details (telephone, telex or fax number, contact person) of the exporter and importer.

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17 New Zealand Institute of Gene Ecology, *Submission to New Zealand Ministry of Foreign Affairs and Trade concerning the Second Meeting of the Parties to the Cartagena Protocol on Biosafety*, available at http://www.twnside.org.sg/title2/service193.htm.

Norway supported option 1 and supported the decision of COP-MOP1 urging parties to appoint the importer and exporter as contact points.

Romania supported the EU's position, as it was going to accede to the EU in 2007 and thus was bound to adopt EU laws, including the directive on importation of GMOs.

Industry supported option 1 on the following grounds:

- If required, the import official can easily contact the importer, taking advantage of the fact that the importer is in the same time zone and speaks the same language.
- The importer knows the terms of the contract and therefore is the most knowledgeable on what is contained in the shipment.
- When further information is required, the importer knows how to contact the exporter who can provide the information or, if more-technical information is needed, knows how to obtain the information from the competent national authority(ies) named by the country of export.

The IGTC even attached a list of its member organisations plus the name of the person appointed as the contact point in such organisations.

Analysis

For African states and developing states, it would be cost effective to support option 1, as signatories are obliged to set up a biosafety clearing house (BCH), so it would not be necessary to list all the people who had handled the LMO. This information could be posted on the BCH website. Furthermore, the importer and exporter are most likely to know more about their shipment than a party who is not involved in the contract of shipment.

It also seems that the exporter is going to bear the cost of implementing these new requirements. The IGTC has already stated that complying with the protocol would mean an extra cost of 10–25%.[18] Even the importer will have to bear certain costs; for instance, customs officials will now have to look for the wording prescribed under the Cartagena Protocol. This would entail more time and would slow down the movement of grains, whether or not they contain

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18 For a clear indication of what is involved in implementing the Protocol from the transporters' and exporters' points of view, refer to IGTC, 'GMO regulation and acceptance: An international trade perspective.' *Paper presented at the International Biotechnology Conference*, 12 October 2005, Iowa, USA, available at http://www.grains.org/ppt/ibic/2005/405_Green.ppt.

LMOs. Such costs have to be analysed properly in order to determine their impact on importing countries, which more times than not are poor African states.

The extent and modality of using unique identifiers (UIDs)

Article 18(2)a of the Cartagena Protocol provides that the COP shall take a decision on the detailed requirements for any unique identification for LMOs. Decision BS-I/6 of COP-MOP1 urged parties to formulate requirements for a UID code. A UID is a code similar in concept to the ISBN system in book publishing.[19] When this code is entered into a specific database, one can access full information about a specific LMO, including the specific details of how the LMO has been modified, its characteristics and its names, among other details. This system would help in identifying and monitoring LMO-FFPs approved by national authorities and would ease the flow of information between parties and the public.

Currently, an international system of UIDs is being developed for the Cartagena Protocol. Furthermore, the Organisation for Economic Co-operation and Development (OECD) has created and adopted a system of guidance for the designation of a UID for transgenic plants, which can be used to access an OECD database to find information about LMOs that have been approved for commercial use.[20]

Three options exist:

1. no UIDs on accompanying documents;
2. no UIDs until the need is established through further experience in the implementation of the other identification/documentation requirements under article 18(2)a; or
3. OECD UIDs for transgenic plants and other UIDs, where available, and an Internet address of the BCH.

The BCH was established under article 20 of the Cartagena Protocol and is basically a website that will contain information made available by parties about the implementation of the Protocol, including all laws, regulations and guidelines for it implementation; any bilateral, regional and multilateral agreements and arrangements; summaries of its risk assessments or environmental reviews

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19 See IUCN Environmental Law Centre, *Explanatory Guide to the Cartagena Protocol on Biosafety by IUCN*, available at http://www.iucn.org/themes/law/pdfdocuments/Biosafety-guide.pdf.

20 For further information on this, refer to ENV/MONO(2002)7, reproduced in UNEP/CBD/ICCP/3/INF/12, available at http://www.olis.oecd.org/olis/2002doc.nsf/LinkTo/env-jm-mono(2002)7.

of LMOs generated by its regulatory process; relevant information regarding products such as processed materials that are of LMO origin; and detectable novel combinations of replicable genetic material.

Some parties supported option 2, most notably Australia.[21] That country argued that article 18(1) states that in order to protect biological biodiversity, parties involved in trans-boundary movement of LMOs should take necessary measures to ensure that the LMOs are handled, packaged and transported under conditions of safety, taking into consideration relevant international rules and standards. Thus, before adopting UIDs, it has to be proved that they are necessary measures. And this cannot be determined until it has been proved that the documentation requirements identifying LMO-FFPs are a necessary measure, and if they are, whether other measures are also needed to give effect to the first set of measures. This is to be achieved by looking at each country's experiences in implementing these provisions.

Australia also criticised any form of UID system, because it does not provide for a solution in situations where there are inaccuracies or the information is incomplete, and whether and how any UID would be verified. It also criticised the OECD system on the following grounds:

- Its scope is limited, as it only applies to LMO plants and does not cover LMO microbes or viruses.
- The system is voluntary and at an early stage of development.
- The veracity of UID information in the database is not guaranteed.

Other parties supported option 3, especially the EU, Canada and the industry (IGTC and GIC). They argued that the OECD UID system has already been implemented in their systems, and all importers of LMOs are required to submit a UID code. India supported this, but further argued that the Internet site for the BCH should be specified in order to facilitate easy access to information.

Japan also supported the OECD system and argued that documents should only contain the UID code, while all other information such as taxonomic name and gene modifications inserted should be found on the BCH website, since such technical information is not always necessary for someone who does not have the necessary expertise and knowledge of LMOs. It also complicates the whole purpose and operation of the documentation.

African countries have not yet implemented the OECD system, but supported the idea of a system of identification, whether or not it was based on the

21 UNEP/CBD, *Handling, Transport, Packaging and Identification (Article 18)*, *op. cit.*, p. 6.

OECD system. However Guinea-Bissau felt that before such a system could be implemented, there had to be capacity building at the national level first.

Analysis

If African states are going to adopt UIDs as a way of identifying LMOs, two issues need to be looked at: firstly, who is going to pay for the adoption of the UID system; and secondly, which UID system is going to be adopted.

The first issue of costs is important, because such costs have to be quantified or at least estimated to see if it is feasible to adopt a particular UID system. Furthermore, the system is largely dependent on the BCH's website. Thus, if African states choose to adopt another system, such a system has to be capable of being assimilated into the BCH system. Alternatively, African states have to create their own database for the information regarding LMOs. All this does not only require money; it also requires the development of a skilled workforce that would be able to capture and maintain the data that is required. So funding is critical.

Regarding appropriate systems, it is suggested that parties should adopt the OECD system, as this has already been put into practice (despite some of its shortfalls). It will also be necessary to harmonise the various systems, as this would mean less time spent in searching for a specific LMO across UID systems. For instance, if an LMO has one code under the OECD UID system and another under the African system, parties would have to ensure that the LMO being dealt with is the same one under both systems. Also, the shipment documentation would then have to contain two different codes, which would be wasteful. Thus, African states have to look at this issue critically.

Also, what will be the link between the UID system and the 'may contain' phrase? By its very nature, a UID code will only be used when parties are indeed sure that the product they are dealing with is an LMO, as the UID code is the code one would use to search for information on how the product has been genetically modified, any risk assessments that were done, etc., while one could put the 'may contain' phrase in documents accompanying exports that do or do not contain LMOs. So even if one was sure that the product being exported was an LMO, exporters could still put the 'may contain' phrase in their documentation. This sounds absurd, but that is why parties at COP-MOP2 were urged to identify exports as 'contains LMOs' where they were sure that the export is an LMO.

Thresholds for adventitious or unintended presence of LMOs to trigger identification requirements

This requirement deals with the scenario where the shipment of non-LMOs contains LMOs unintentionally or adventitiously. So when a shipment that was supposed to be non-LMO, and therefore not subject to article 18(2)a, is discovered to have LMOs, what percentage of LMOs in such a shipment should trigger the application of article 18(2)a? For instance, the EU has a threshold of 1%. Therefore, if a shipment contains LMOs that make up less than 1% of the shipment, the exporter does not have to specify that the shipment may contain/ contains LMOs, or does not have to comply with article 18(2)a. The shipment is therefore deemed to be a non-LMO shipment. The debate revolved around shipments for approved and unapproved LMOs. Under article 17 of the Cartagena Protocol, a party is required to notify affected states when it becomes aware of an occurrence under its jurisdiction resulting in a release that leads or may lead to an unintentional trans-boundary movement of an LMO that is likely to have a significant adverse effect on biodiversity in a receiving country. Some argue that such notification has to be in terms of article 18(2)a, so now the debate becomes which threshold triggers this article.

The Protocol is silent as to who has the obligation to test. But it seems that it is the importing states themselves that have the obligation to do so. This makes sense, because we are dealing with adventitious or unintended presence of LMOs, which means that the presence of these LMOs in the consignment was not foreseen by the exporting party. Furthermore, the parties would have most probably taken steps to ensure that the consignment that contains non-LMOs does indeed not contain LMOs. Of course, this may not always be the case, as there could be exceptions, but if the regime is going to be as unrestrictive to trade as possible, it only makes sense that there should be a presumption that consignments do not contain LMOs until proven otherwise by a suspecting party.

Thresholds for approved LMOs

Here four options exist:

1. Thresholds for particular LMOs based on scientific risk analysis shall be adopted by the COP-MOP. The thresholds could be developed by other relevant international organisations such as the Codex Alimentarius Commission and International Plant Protection Convention (IPPC).
2. National thresholds may be adopted or applied on a case-by-case basis by

national authorities for particular LMOs or groups of LMOs, taking into account the characteristics of the receiving environment.
3. There should be no thresholds.
4. There should be a temporary 5% threshold of all commodity shipments where the LMO varieties are grown.

Australia supported option 1 and opposed any thresholds under the Cartagena Protocol, because article 18(2)a only deals with shipments of LMOs intended for FFPs and not non-LMOs. Therefore, where a shipment of non-LMOs is found to contain some LMOs, this is a separate issue that cannot be dealt with within the context of the Protocol.

Canada supported option 1 as well and argued that article 18(2)a only applies to LMOs intended for FFPs, and so any adventitious presence of LMOs in non-LMO shipments intended for FFPs will not be introduced into the environment, and therefore article 17 will not apply. Perhaps a better way of explaining this would be that even though a non-LMO shipment of commodities contains LMOs, article 17 would not apply if such a shipment were meant for FFPs, as article 17 will only apply when the LMO is released into the environment.

The EU, Norway and African countries supported the idea that each country should have a threshold and it should be dealt with under article 18(2)a. Furthermore, article 17 applies to all LMOs likely to have significant adverse effects on the conservation and sustainable use of biodiversity, taking into account risks to human health in affected or potentially affected states. Thus, even if an LMO is in a shipment intended for FFPs, it still has the inherent potential to cause damage to the environment and should therefore be subject to article 17. Japan supported option 2 and stated that threshold levels for approved LMOs should be set at the national level, taking into account the conditions in the receiving environment or the risk profiles and the type of LMO usually imported into the environment.

The US and the industry argued that the issue of threshold was complex, due to testing limitations and the nature of bulk grain production, handling and transportation systems. It argued that articles 18(2)a and 17 are mutually exclusive, as the 'may contain' documentation in article 18(2)a is for identifying cargo, while article 17 addresses unintentional trans-boundary movement of an LMO likely to have a significant adverse effect on biological diversity. Subsequently, they have supported the option of a 5% threshold, and the grain industry group has encouraged the Codex Alimentarius Commission and IPPC to speed up the development of science-based risk management thresholds for LMO material in non-LMO products.

Thresholds for unapproved LMOs

There are two options here:

1. No thresholds could be set.
2. National thresholds could be adopted.

The EU has set a threshold of 0.5% for such LMOs.

Japan supports a threshold to be set at the national level, depending on conditions in each country.

Some countries stress a no-threshold option for unapproved LMOs, as these have not been tested and any risk has not been ascertained. The African Group is in this category.

Analysis

The issue of establishing thresholds poses significant problems for developing countries, because if a threshold is set, every shipment that could have been contaminated has to be tested to ensure whether or not the threshold has been passed. This requires that such countries have the capacity to test these shipments in order to ensure that the threshold has been met or not, and most of them lack the capacity to do so. If they choose not to have a threshold level on these grounds, they are most likely to come into conflict with the EU through contamination of their environments, a situation that they have been trying to avoid. Therefore they are in a dilemma.

A mitigating factor, perhaps, is the fact that these countries do not allow any production of LMOs and thus are unlikely to have a shipment that is contaminated. However, those that allow the import of LMOs as food assistance risk having their shipments contaminated. Clearly, this is a major issue in Africa.

Also, it is unclear whether 'no threshold' means a '0% threshold' or 'no threshold at all'. From the arguments put forward, it seems that when dealing with unapproved LMOs, no thresholds should be set and any trans-boundary movement of unapproved LMOs should be prohibited.

Harmonisation of sampling and detection techniques

Where documentation under article 18(2)a is presented, importing states will most likely be inclined to test for LMOs if such a shipment does contain LMOs. Testing becomes imperative where thresholds are set, as the eligibility of shipments for imports depends on whether a certain threshold has been met or

not. The problem with testing is that different countries use different tests, and this means that results could be different. Thus, it creates uncertainty, especially for exporters, as they are not sure whether their shipment is subject to article 18(2)a, as one test could find that the shipment is not contaminated, while another could find that the same shipment is subject to the article. So COP-MOP has to settle this issue. There are three proposals to be discussed:

1. One or more techniques that are most suitable for any particular LMO shall be determined and adopted as the standard technique(s) for that LMO.
2. Criteria for acceptability of sampling and testing techniques for any particular LMO shall be determined, and any technique that meets the criteria may be used for that LMO.
3. The selection of the techniques or the establishment of criteria for acceptability of the techniques may be undertaken by other competent international organisations, or such undertaking may benefit from existing work on harmonisation of LMO sampling and testing techniques by those competent bodies such as the Codex Committee on Methods and Analysis of Sampling.

Australia supported option 1, because there are different sampling and testing technologies that can be used to detect the presence of LMOs, which have different strengths and weaknesses. Therefore, the method that is most suited for each LMO must be determined on a case-by-case basis. It also seemed to support option 3. The African Group did not make any presentations on this issue. This is understandable, as none of them has had an experience in testing LMOs at its borders, and they are only now setting up legislation implementing the Cartagena Protocol. For South Africa as a potential exporter of GM grain, it may not be in its interest to have a stringent regulatory regime for LMOs, especially one that increases costs for transporters. As the recent 2004/05 annual report by the National Department of Agriculture stated, growth in GM maize planted has increased from 1% in 1999 to 10% in 2005.[22] Even more local farmers are growing GM crops such as Bt cotton. It is submitted that a stringent regime will mean transporters will transport LMOs at a higher price than non-LMOs, and this could mean that extra costs will be channeled to the farmers. In turn, the farmers' profits would be reduced. Therefore, South Africa has to look at its negotiating position carefully, as a country that has commercialised LMOs and thus has different interests from most African states, which have none as yet.

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22 See Department of Agriculture, *Department of Agriculture Annual Report 2004/2005*, available at http://www.nda.agric.za/docs/Annual2005/agricprod.pdf.

Analysis

The issue of handling packaging, identification and transportation is a crucial one and was one of the reasons COP-MOP2 failed. The main issue is finding requirements that are the least trade-restrictive, but that also provide the necessary information that countries need before accepting the importation of an LMO. Also, some of the problems with the tests have been mentioned. It is also evident that testing will require capacity building if countries are to screen LMO shipments. This is one of the setbacks with the adoption of the system as a whole, and thus efforts to speed up capacity building should be encouraged, otherwise poor countries will simply not measure up.

There is also the issue of maintaining the whole system once it has been implemented. It is evident that laboratories for testing LMOs have to be set up, will have to be well equipped and must have the right staff. All this needs resources. Countries should therefore find out how much such laboratories cost to run before committing themselves to setting them up. It was also estimated that to sample an LMO shipment usually takes five to seven days, and within this timeframe, transporters will have to pay costs of up to $30,000 a day if a ship is to wait for tests.[23] This shows the cost implications of setting up these systems.

Finally, it is also evident that over-regulation may stifle the biotech industry, and this is not the intention of the CBD or the Cartagena Protocol. It seems that some of the positions taken on this issue are aimed at stopping trade in LMOs completely rather than adopting measures that protect biodiversity. Whereas some states might have socio-economic and even political reasons for doing so, states should not lose track of the main objective of the Protocol, which is to protect biodiversity.

THE LIABILITY AND REDRESS DEBATE

Introduction

Article 27 of the Cartagena Protocol provides for the establishment of a liability and redress regime to provide for compensation for loss suffered due to the trans-boundary movement of LMOs. The kinds of questions that have to be asked in establishing such a regime are:

- What kinds of loss or damage should be compensated for?

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23 *Ibid.*

- What types of remedies should be available for damage resulting from the trans-boundary movement of LMOs?
- Who should pay for such loss or damage?
- In what circumstances should redress be made?

These issues are complex and could not be resolved during the COP negotiations. Article 27 therefore contains what is called an 'enabling' provision; ie. it requires the first meeting of the COP-MOP to establish a process to consider this issue, and establishes a timeframe for this process. These issues are considered below.

Scope of damage

The scope of damage refers to which kind of actions a liability regime will apply to; ie. the kind of actions leading to damage that will trigger the application of the liability and redress regime. It also covers geographical scope; ie. only damage resulting in a specific area will be subject to the regime.

Functional scope

With regard to functional scope, there were two options for damage that would be subject to the Cartagena Protocol:

1. either damage resulting from transport of LMOs, including transit; or
2. damage resulting from transport, transit, handling and or use of LMOs that finds its origin in trans-boundary movements of LMOs, as well as unintentional trans-boundary movements of LMOs.

Most African representatives were in support of the latter option, as it covered damage arising from a large number of activities and thus was wider.

Industry was of the opinion that option 1 was the best, as the article 27 process is limited to consideration of liability and redress for damage resulting from trans-boundary movements, which includes transit, but is not limited to transport activities. Movement from a port to a point within a state is not trans-boundary movement, since the movement is within a single state, or intrastate. On the other hand, damages resulting from or during intrastate movement related to shipping, handling, storage, packaging, labelling or use are not subject to the article 27 process, because they do not result from trans-boundary movement. Such damages could be subject to national liability regimes.

Optional components for geographical scope

Here there were three options. The regime would either apply:

1. to damage caused in areas within the limits of national jurisdiction or the control of parties; or
2. to damage caused in areas within the limits of national jurisdiction or the control of non-parties; or
3. to damage caused in areas beyond the limits of national jurisdiction or the control of states.

The African Group supported the first and third options. It was also suggested that the third option be re-worded to read 'damage caused in areas within and beyond the limits of national jurisdiction or the control of states.' It was also felt that since non-parties had willingly refused to sign and/or ratify the Cartagena Protocol, they should not benefit from the liability regime, and thus any damage caused within their areas was not subject to the regime.

Industry also believed that injury occurring in a non-party could not be subject to the regime, as there was no legal basis for it.

Analysis

It is suggested that if non-parties are not to benefit from the regime, then the third option should not be supported, and African countries should only go for the first one. This is because when it says 'damage caused in areas within and *beyond the limits of national jurisdiction or the control of states' it means the* regime will apply even outside party states' jurisdictions, and this will include non-party states, as non-party states are areas beyond the limits of national *jurisdiction or the control of states.*

Damage

Parties negotiated on the kind of damage that would be applicable to the regime. Here there were six options regarding the kind of damage the regime would apply to:

1. damage to the environment;
2. damage to conservation and the sustainable use of biological diversity;
3. damage to human health;
4. socio-economic damage, especially in relation to indigenous and local communities;

5. traditional damage:
   i. loss of life or personal injury;
   ii. loss of or damage to property; and
   iii. loss of income; and
6. costs of response measures.

Note that the environment was seen as a broader concept than biological diversity, as the former included damage to biological diversity or its components, impairment of soil quality, impairment of water quality and impairment of air quality. Some parties wanted the regime to apply to the environment, not just biological diversity. Industry argued that under the CBD, article 14.2 states that the CBD only applies to damage to biological diversity, without reference to its components. Thus a protocol under the CBD should apply to biological diversity only, otherwise it would be outside the scope of the CBD. Thus the words 'and its components' had to be deleted. Furthermore the word 'damage' cannot be defined to mean that change itself equals harm, since change may be benign or even positive. Therefore damage to the environment could not be covered by the regime under the Cartagena Protocol.

Covering damage to the environment could lead to a violation of WTO rules, because one can argue that LMOs and non-LMOs are like products, and under the SPS Agreement, one cannot discriminate between like products. Subjecting LMOs to a liability regime on the grounds that it impairs soil, water or air quality is discriminatory in that non-LMO crops also cause this kind of damage and yet they are not subjected to a liability and redress regime. For instance, the use of fertilisers has in certain circumstances led to soil or water quality impairment. Thus, saying that LMOs will be subject to the regime when non-LMOs, which cause the same damage are not, is discriminatory. Furthermore, conventional crops have led to loss of biological diversity, especially when large areas of land are cleared in order to make room for such crops to be grown. Since it still remains to be seen whether or not LMOs and non-LMOs are like products, one has to take a cautious approach to this issue and keep an eye on the current WTO dispute between the EU and US over biotech products, as this was one of the contentions in these cases.

A second form of damage that the regime could apply to is the damage to human health, which includes loss of life or personal injury, loss of income, public health measures and impairment of health. The African Group supported the inclusion of this kind of damage. However, industry was of the view that such damage is unlikely to happen and thus there is no point in regulating it. Furthermore, even if it happened, such damage would be adequately covered under the local legal system of states, so that having an international regulatory

system would be pointless. Alternatively, the Cartagena Protocol only refers to damage to human health arising from impacts on biodiversity. Thus, it would only apply to a situation where an LMO caused damage to biodiversity and such damage to biological diversity led to damage to human health. It would not apply when the LMO caused damage directly to human health.

A third type of damage is socio-economic damage, especially in relation to indigenous and local communities, such as loss of income; loss of cultural, social and spiritual values; loss of food security; and loss of competitiveness. It is hard to picture how importing Bt maize could lead to loss of social values. Furthermore, when establishing such a legal regime, it has to be in line with already established legal norms. For practical reasons, there is no such thing as compensation for loss of social, cultural and spiritual values, otherwise one would, for instance, be able to sue for the effects of globalisation. Perhaps under this sub-heading the most feasible ones are loss of income and loss of food security.

The latter can be looked at in the light of LMOs that do not breed through and the fact that people have to buy seeds. People who are not aware of this risk losing food security, and they could have a claim. But this depends on whether they knew about it or not. Furthermore, in a situation where the LMO contaminated other non-conventional varieties that breed through and as a result a farmer is unable to save seeds, or even if he saves such seeds, the seeds would be of no benefit to him. Establishing damage that can be compensated for in such cases makes sense. There have been cases where a farmer has sued for contamination in certain countries.

Still, industry also argues that socio-economic values are subjective and unique to each country, and will vary even within a state, so determining loss would be difficult. Furthermore, such damage would inhibit development of promising new technology, because it would cause the new technology to bear the cost of replacing the outdated or less desirable one. In addition to this, article 27 does not mention such damage, and thus it should not be included.

Causation

Causation means that there is a connection between the act and the damage; ie. the act must have resulted in damage. Where this link is absent, one cannot be liable in law. A clear situation would be an LMO causing loss of biological diversity. Here the debate revolved around the level of regulation and the establishment of a causal link between the act and the damage.

Level of regulation

Here the question was whether the regulation should be international or national. The African Group favoured an international system, and some even both.

Establishment of a causal link

Here there were three issues:

1. the test to determine if causation has been established;
2. cumulative effects and the complexity of interaction of LMOs with the receiving environment; and
3. time scales.

According to the proposals, the tests included the foreseeability test, direct or indirect damage, proximate cause and a vulnerability clause. These tests and their implications are discussed below.

The foreseeability test

This test typically asks whether a reasonable person would have foreseen that the act would cause the specific damage. If not, then there is no link between the act and the damage, and one cannot be liable.

Direct or indirect damage

This test asks whether the damage is a direct result of the act, or whether it is an indirect one. An indirect result would be where a country is importing maize and an accident occurs that results in the LMOs contaminating other crops or plants. The question then becomes whether the import was the cause of the damage or not.

Proximate cause

This test asks how closely related the act has to be to the damage to allow one to state that the act caused the damage. An example could be where an importer is importing LMOs and due to an accident the LMOs are released and are carried by rain to an area and then are picked up by birds that drop the LMOs in another area where they germinate and contaminate other plants, leading to biological diversity loss. Is the import still the main cause of the loss, and should the importer be liable?

Analysis

In most legal systems, or at least in the South African legal system, all these tests apply, depending on the facts of the dispute. Sometimes more than one test can apply to the same facts. For example, the foreseeability test and the proximate cause test could apply mutually, so it is possible that applying one does not necessarily exclude the other. However, in some circumstances, problems could arise where one test leads to one result while another leads to a different result. In that kind of a situation, the court or tribunal uses its discretion to determine which test is more fitting.

It has to be stressed that where the above tests have not been met, causation is not proved and the claim has to be thrown out. Furthermore, it is clear that causation is very difficult to prove in these cases, as the damage caused by LMOs is not clearly detectable in the same way that, for instance, damage caused by oil spills and nuclear waste is. What makes causation even more difficult to prove is that there are other elements that could or do lead to loss in biological diversity, so pin-pointing a specific element is difficult. Also, in some instances, there are acts that break the chain of causation between a specific act and the loss. For instance, where an LMO was released into the environment, but the government failed to react quickly and loss was suffered due to the failure of the government, is the importer still liable? Normally, failure of the government to act timeously would break the causal link between the act and the loss, and thus an operator would not be liable. It is in these kinds of scenarios where causation is crucial, because where you have multiple causes of biodiversity loss, a clear link has to be established in order to discover exactly which agent caused the specific loss. Failure to establish causation or a causal link between the act and loss would potentially result in innocent parties being found liable for acts that they did not commit. So this issue has to be looked at critically. It has been admitted that proving causation could be difficult, but to exclude it as a requirement for liability is also untenable. In the end, negotiating parties will have to find a solution that balances these opposing considerations.

Burden of proof

Meaning

In the negotiations, the issue of burden of proof has to be considered. This issue is important, because it determines how a claim is to be proved. When used in a general sense, burden of proof has two meanings. The first is the amount of

evidence the person making allegations has to adduce in order to win the claim. In criminal cases, the evidence has to be beyond reasonable doubt; ie. the only conclusion that a reasonable person would draw from the facts, after all the evidence has been given, is that the wrongdoer is guilty. In non-criminal law cases, the burden of proof is on a balance of probabilities – what is called a 50% + 1 standard; what would be called a simple majority in voting. This is less onerous and requires the judge to decide which of the two versions of the facts given by the two opposing parties is most likely to be accurate, even if a reasonable man would have doubts as to the merits of either of the two cases.

The other problem of the burden of proof is the issue of who has the duty to prove the case and thus present the facts first so that the other party rebuts such facts. In a criminal case, it is always the state that has to prove the case. However, in civil cases,[24] the norm is that the person who makes the allegations must prove his/her case; ie. if X claims that he suffered loss, then it is he who has to prove that he suffered that loss as a result of Y's action.

In the kind of regime that is being proposed, it is only fitting that the burden of proof should be on a balance of probabilities, as we are not dealing with crimes, but rather with a tort or delict; ie. a wrongful act that causes loss but is not a crime.

Relaxation and reversal of the burden of proof

In the next meeting, parties are to negotiate whether or not to relax and reverse the burden of proof. Relaxation of the burden of proof means that a claimant would have to prove his/her case at a lower standard than that of the usual balance of probabilities. Therefore, he/she would still be compensated even if he/she proved his/her case below the 50% + 1 standard. This would mean that the party whose case carries less weight would win, which violates one's sense of justice. This is a problem, and this system would most likely not be followed, as it has long been established that the burden of proof is either on a balance of probabilities or beyond reasonable doubt. This is customary in all – or at least in most – legal systems, and the courts have not moved away from either of these standards. It is unlikely, therefore, that a tribunal or court that is hearing any liability case dealing with LMOs would apply a burden of proof that is less than these established standards.

Reversal of burden of proof would mean that whereas in normal circumstances

24 For example, cases that deal with compensation of people who have suffered loss due to the non-criminal but wrongful acts of others.

the victim has to prove his/her case and allow his/her opponent to rebut the allegation, in a reversal of the burden of proof, the wrongdoer is presumed to have caused the damage before any evidence is even presented, and he/she then has to prove that he/she did not commit the act. This is typical of authoritarian states and is not in line with human rights, especially the right to a fair trial. Reversing the burden of proof is akin to presuming one to be guilty until proven innocent, when the norm is that one is innocent until proven guilty. Furthermore, it puts the alleged wrongdoer in a hard place, because he/she has to prove a negative; ie. that he/she did not do something. Therefore it is unlikely that any court or tribunal will reverse the burden of proof.

Furthermore, as with the relaxation of the burden of proof, it is the norm that in non-criminal cases, the person who makes the allegations must prove the case, and the courts do not diverge from this principle. Thus, courts or tribunals would be reluctant to reverse the burden of proof, especially because it is traditional that this cannot be done, especially in states with constitutions that guarantee people's rights.

Of course, reversing the burden of proof or relaxing it would be more advantageous to victims who have suffered such loss due to trans-boundary flows of LMOs, as it would make it easier for them to prove their case. This is important, because most victims, especially the poor, will not have the resources to claim against a huge company such as Monsanto. However, policy issues have to be taken into consideration, such as the fact that there are some people who would bring fictitious claims and would be awarded compensation just because the burden of proof was relaxed or reversed. In other words, it would open the floodgates for unscrupulous people to abuse the system. Thus, to safeguard developers or importers of LMOs from these fraudulent and malicious claims, it is recommended that the burden of proof should be neither relaxed nor reversed.

Conclusion

The issue of burden of proof is very important and lies at the heart of any liability and redress regime, because it determines how easy or difficult any damage or loss suffered is to be compensated for. Furthermore, if not looked at carefully, some injustices could be done either against a genuine victim or an importer or developer of LMOs. So a balance has to be achieved whereby the victim does not have an onerous duty to prove his/her case and where a developer is not found liable on the most flimsy of evidence.

Channelling liability; role of parties in import and export; standard of liability

Possible approaches to channelling of liability

Channelling of liability usually refers to how one determines who is going to be liable for a loss suffered. Under the negotiations, it was proposed that the regime should be based on state liability. Under this proposal, state liability was either going to be based on primary state liability or residual state liability. Primary state liability means that states will be liable for any loss resulting from the trans-boundary movements of LMOs, even if the state itself was not involved in such trans-boundary activities. Furthermore, a victim will have to sue the state first before he/she sues the specific company or person who was involved in the trans-boundary movement of LMOs.

On the other hand, residual state responsibility means that one has to sue the operator first, and if the operator cannot satisfy the victim's claim, as when it does not have enough cash and/or assets, then one can claim the remainder from the state.

The final option is that the state is not liable at all, and operators are to be totally liable for any loss, and if they cannot satisfy the victim's claim due to lack of adequate assets or cash, then the victim will have no other recourse.

Industry supported primary state liability, because, it argued, states approve the trans-boundary movement of LMOs, and thus any damage arising from this has to be imparted to states, not operators. The African Centre for Biosafety argued that states should be liable, as they are obligated to protect, within their own territory, the rights of other states to territorial integrity and inviolability. The Centre quoted Principle 21 of the Stockholm Declaration and Principle 2 of the Rio Declaration[25] as recognising the general duty of states for trans-boundary harm, and thus states must take measures to prevent the occurrence of trans-boundary environmental harm, and where harm does occur, to redress the consequent damage. The Centre argued that though private individuals cause the environmental injury in their personal capacity, states still have the obligation to prevent harm by taking appropriate measures by exercising due diligence to prevent private individuals from causing environmental harm.[26]

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25 Principle 2 of the Rio Declaration proclaims that 'States ... have the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction', while principle 21 of the Stockholm Declaration is the same as principle 2 of the Rio Declaration, verbatim.

26 Note that principle 21 of the Stockholm Declaration and principle 2 of the Rio Declaration are

The issue of state liability is a complex one and needs to be looked at carefully, especially because, under international law, states are only liable for internationally wrongful acts, or for acts that are not prohibited by international law but that cause or have the potential to cause harm. In view of the fact that LMOs are not ultra-hazardous, like nuclear waste, arguing that they are is a long stretch. Also, since LMOs have to go through rigorous testing before they are released, states could argue that they took reasonable steps to ensure that damage to their own as well as their neighbours' environments was avoided. Thus, one could argue that states did undertake due diligence before approving LMOs and thus liability should not be imputed to them.

Furthermore, where consent to import or export is granted, one has to ask which state will then be liable. Will both states be liable for approving the import and export of LMOs, or should the state in which the damage occurred be exempted from liability? There is also the danger that developing countries and LDCs themselves could be liable for any damage for allowing imports, especially if primary state liability is the norm.

Also, it is to be remembered that the Stockholm and Rio Declarations on which the Centre bases its arguments do not have binding force, as they have not attained the status of international law. Therefore basing arguments on these instruments is misleading, as such arguments are only persuasive and do not have binding force. This is the main problem with regulating environmental damage in general, as most of the rules in international environmental law are based on 'soft law'; ie. rules that are not necessarily binding, though they are generally accepted in treaties, etc. These rules are enforceable when dealing with issues such as nuclear waste or the release of dangerous chemicals, as was witnessed in the recent benzene incident in China. But where agents such as LMOs cause damage or there are issues such as the release of pollutants that do not have immediate short-term effects, the issue becomes blurred. A good example is the regulation of greenhouse gases. The damage caused by these agents is not immediate, nor is it visible in the same way that the radiation from a nuclear plant causes damage. Thus, one cannot use the Stockholm or Rio Declaration to find the US liable, as the largest producer of greenhouse gases, for example. The damage caused by most LMOs is similar to that of greenhouse gases in that it takes a long time to occur and it does not affect human beings directly. It now

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relevant because they represent the first occasions that the precautionary principle was officially recognised as a legal principle. Furthermore, these declarations were some of the first instruments that not only highlighted environmental protection as an issue that countries had to pay attention to, but also established the legal principles that are the bedrock of environmental law.

becomes difficult to use the same rules that were applied to damage caused by nuclear waste to LMOs, especially because you do not see people suffering from cancer due to LMOs.

To sum it all up, therefore, before deciding trans-boundary state liability, international rules have to be looked at carefully to determine whether they form internationally binding obligations, especially where no harm is visible to humans. It is to be noted that not all damage to the environment is prohibited, as witnessed by the release of greenhouse gases and the impact of farming on the environment, to mention two instances. So the test should be whether damage to the environment by LMOs is so bad when compared to the damage caused by other agents that it warrants a separate liability regime to find states liable.

On a practical note, states will be reluctant to propose a system that finds them liable for loss, on the grounds that it makes them vulnerable to possible litigation, and this implies extra costs for them. Since it is states that negotiate these protocols, such a proposal is less likely to be made, and even less likely to be successful.

Channelling of liability also needs to be looked at from a broader, food security perspective. GMOs are increasingly being used for humanitarian relief in areas affected by hunger, especially in Africa. This trend is likely to increase as humanitarian support groups such as the World Food Programme (WFP) are overstretched due to recent natural disasters elsewhere, such as the tsunami of 26 December 2004, Hurricane Katrina, and the earthquake in Pakistan and India. All this has occurred at a time when the WFP was announcing that flows of aid declined by as much as 30% between 2003 and 2004 alone.[27] It thus seems that LMOs will play a bigger role in hunger relief, as countries will be forced to accept them out of necessity. Thus, imposing strict regimes will mean that even the WFP could be found liable for trans-boundary flows of LMOs. This would put poor states that are in need of help from relief organisations between a rock and a hard place. Therefore it is suggested that states go for non-state liability, but create exemptions stating that organisations such as the WFP will not be subject to the regime.

27 See, for instance, the speech of James T. Morris, executive director of the WFP, to the World Affairs Council in August 2005, p. 10, available at http://documents.wfp.org/stellent/groups/public/documents/newsroom/wfp076461.pdf.

Standard of liability and channelling of liability

Fault-based liability versus strict liability

Fault-based liability generally means that a person or state is liable for an act if he/she/it acted negligently or intentionally to cause damage. A person or entity is said to be negligent if he/she/it acts carelessly, thoughtlessly or imprudently and in doing so fails to adhere to the standard of care legally required of him/her/it;[28] in other words, he/she/it fails to act as a reasonable person.

To determine if someone is negligent, one asks whether a reasonable person in the position of the wrongdoer would have foreseen the reasonable possibility of his/her conduct causing injury to another, or property or patrimonial loss and would take reasonable steps to guard against such occurrence and the wrongdoer failed to do this. Intention, on the other hand, means that he/she wants to act and knows that his/her action is wrongful, but nevertheless does it. Therefore he/she is only liable when these elements are present. If not, then he/she is not liable.

Strict liability, on the other hand, means that a person is liable even when he/she did act like a reasonable person, for instance, by taking reasonable steps to prevent damage. Therefore, in strict liability you only ask whether the person acted wrongfully and if such action caused damage. If he/she did act wrongfully, then he/she is liable regardless of what was going on in his/her head. In fault-based liability you ask whether he/she acted wrongfully and such action caused damage and if the person acted reasonably or not. If he/she acted reasonably, then he/she cannot be liable.

The annex attached to UNEP/CBD/BS/COP-MOP/2/1 proposes two options of strict liability. The first is where the liability regime simply states that where there is damage, one or more of the following will be liable: the developer, producer, notifier, exporter, importer, carrier and supplier. The other option is that liability is channelled on the basis of a causal link. The difference between the two is that in the first option, once damage occurs, one does not have to find out who caused the damage. Instead, where damage has occurred, the persons mentioned are automatically liable regardless of whether they were involved in the events leading to the damage. On the other hand, liability based on a causal link means one has to determine who among the abovementioned was directly responsible for the damage.

The view of civil society, as presented by African Centre for Biosafety, is that its

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28 Neethling J., J.M. Potgieter & P.J. Visser, *Law of Delict*. Cape Town: Juta, p. 128.

members support a strict liability regime, because, on the grounds of fairness and equity, those who profit from the commerce involving GMOs should also be held liable, including the producer of the GMO. They are also generally opposed to strict liability based on a causal link, as they feel that poor farmers whose produce have been affected by GMOs do not have the resources to lodge a complaint against, for example, a multi billion dollar multinational corporation.

Industry, on the other hand, feels that a strict liability regime, especially one not based on a causal link, will inhibit development and deployment of new technologies, as operators cannot escape liability by exercising due care and rigorous product stewardship.

Analysis

Firstly, a strict liability regime is advantageous to the person who has suffered loss and wants to claim compensation, as it makes it easier for him/her to do so. He/she therefore does not have to prove that the perpetrator acted negligently or intentionally, as this could be hard – if not impossible – to prove, especially when dealing with multinational corporations that have multiple agents acting on their behalf.

However, it has to be stated that strict liability is usually imposed in rare circumstances, especially where the product at hand is ultra-hazardous. The bulk of liability claims, at least in South African courts, are based on fault liability. Neethling, Potgieter & Visser state that 'strict liability is usually imposed in cases involving activities which, as a rule, create extraordinary increases in the risk of harm to the community and is restricted in most cases to damage to life, limb and property'.[29] One therefore has to ask whether this applies to LMOs. On the face of it, it seems this is generally not the case, especially because the term 'ultra-hazardous' usually refers to items such as nuclear waste or oil.

Secondly, strict liability is applied cautiously and in limited cases, because its consequences are usually harsh and unjust. For instance, it disregards the role of the victim where he/she him-/herself was at fault and caused the damage, and therefore the operators could still be liable for the wrongful acts of the person who suffered loss. In normal circumstances, fault on the part of the person who suffered loss is a defence in most strict liability regimes. However, currently this is not even one of the exemptions.

Finally, some civil society groups' claims that it is only ethical that a person who profits from LMOs should be liable is misleading, because it seems to

29 *Ibid.*, p. 365.

suggest that profit making is unethical, which is not the case. Perhaps they should have argued that any manufacturer who releases a product for commercial purposes has a duty to ensure that such a product is not harmful to human beings or the environment. Still, this is also subject to criticism, as there are a lot of products that in the long or short term are harmful to the environment or human beings that are not subject to any liability regime. Cases in point are cigarettes and fuels.

Exemptions to or mitigation of strict liability

Under this heading, there were two options: no exemptions or certain exemptions. All parties agreed that there should be exemptions; the only question was, how many? At the workshop, the majority of representatives agreed that only the following exemptions should exist:

1. *Act of God/force majeure:* Under this exemption, a person is not strictly liable if the damage was caused by an act of God. This could include an earthquake, flood, etc. Here it was argued that the definition of an act of God should be limited, because the blowing of LMO pollen by the wind to non-LMO crops and thus leading to contamination would be an act of God, but saying that this exemption applies in this case would virtually mean no claim could be instituted, as most contamination occurs through movement of pollen. Some believed this was not the farmer's fault and thus it was an act that was not within the control of the farmer. Finding him/her liable on this ground would be unfair.
2. *Act of war or civil unrest:* This is when LMOs are released as a result of civil unrest or war. All the parties agreed that this exemption is necessary.
3. *Intervention by a third party (including intentional wrongful acts or omissions of the third party):* This exemption means that where a third party acted independently and as a result of such action LMOs were released, then the operators should not be liable. Parties supported this exemption as well. However, the African Centre for Biosafety stated that it opposed the application of this exemption (also known as *nova causa interveniens*) until such time as it has information regarding what the exact intervention could be.
4. *Compliance with compulsory measures imposed by a competent national authority:* This basically means that where damage is caused while adhering to compulsory measures imposed by a competent national authority such as a government institution, then the operator should not be liable.
5. *Permission of an activity by means of an applicable law or specific authorisation issued to the operator:* This would mean that when an operator who has been given a

permit or any other authorisation to plant LMOs and such LMOs cause loss, he/she will not be liable.

6. *The state of the art:* This refers to the state of the art in relation to activities that were not considered harmful according to the state of scientific and technical knowledge at the time they were carried out. Thus if LMOs have been tested and found to be no threat to human health or the environment and then a new method of testing is discovered 10 years later and it is proved that they do cause harm, then one will not be liable on the basis that at the time the LMOs were tested they were determined to be of no threat and thus the operator acted in good faith.

The African Centre for Biosafety and the African Group agreed that points (1) to (6) above should not be exemptions, because even though a state may permit the planting of LMOs, some operators might still act recklessly and thus cause damage to biodiversity. Moreover, they argue that point (6) should not be an exception, because it defeats the purpose of the precautionary principle. However, the Centre did not explain how point (6) defeats the purpose of the precautionary principle.

Analysis

Even though exemption (3) is excluded, there is a possibility that its application could be unfair and unjust. For instance, an operator who is obliged to do a certain thing by law will be forced not to do it because his/her act will lead to LMOs causing damage, and thus he/she would be liable under the regime. But then if he/she does not follow the law, he/she could be liable for a crime. Thus, it puts him/her between a rock and a hard place, because either way he/she will be liable. An example could be where an operator is required by law to move an LMO to a factory for testing, but by doing so he/she releases the LMO and it causes damage. Should he/she not take it for testing, he/she will break the law. If he/she takes it for testing and any damage occurs, he/she will be liable as well.

As to the *acta causa interveniens*, it is suggested that even though this may not be an exemption, it could still be used as proof that causation has not been proved. This is because whereas causation implies a link between the act and damage, such a link could be broken by other acts, especially those of third parties acting independently. In the law of delict, a *novus actus interveniens* (a new intervening act)[30] may break the causal link completely, such that the operator is

30 Defined as 'an independent event which after the wrongdoer's act has been concluded, either

not liable. However, for an act to be a *novus actus interveniens*, such an act must not be reasonably foreseeable. Depending on the acts, some acts of third parties are not reasonably foreseeable.

Limitation of liability

Limitation in time (relative and absolute time limits)

Limitation in time deals with the time a claim will expire; ie. when a person has suffered loss, he/she has a certain time limit to institute a claim. Once this time limit has expired, he/she can no longer claim compensation, and the wrongdoer is not obliged to compensate the victim. The question is then, when does the countdown to expiry of the claim begin? Usually it is either from the time the wrongful act has been committed or the time the victim knows (or reasonably ought to know) that damage has occurred.

The Ugandan representative wanted a claim to expire 30 years from the time the victim knows of the damage, and this was supported by a majority of the African representatives.

The African Centre for Biosafety argued that since the risks pertaining to LMOs may take a long time to materialise, no time limits should be imposed.

Industry argued that limitation is an essential feature of any legal system. It further promotes vigilance and care by potential claimants concerning their legal rights, results in fewer evidentiary problems, provides predictability for defendants and, overall, contributes to a well-functioning legal system. Finally, limitation also directly affects insurability. It is a requirement to gain financial security from the marketplace, which will not provide coverage for liability for an unlimited period of time.

Analysis

It is suggested that a claim should expire three years from the time the victim becomes aware or reasonably ought to become aware of the damage. This would mean that even if the damage occurs today and the victim becomes aware of it 15 or 20 years later, he/she would still have a claim. Still on a practical note, it seems that making a claim 20 years from the date of damage will be hard to prove, because as time goes by, witnesses forget and evidence is hard to gather. Furthermore, some LMOs are seasonal, and thus tracing the

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caused or contributed to the consequence;' see *ibid.*, p. 204.

exact LMO that caused the damage would be impossible. Therefore it seems there are large hurdles in proving this.

Settlement of claims

Introduction

Issues under this heading included inter-state procedures and civil procedures. The former relate to the procedures that have to be followed in order for one state to institute a claim against another. The latter refer to rules that have to be followed when an individual institutes a claim within his/her own country. For an explanation of the difference between the two, see the analysis below.

Under civil procedures, three issues were identified: jurisdiction of courts or arbitral tribunals; determination of the applicable law; and recognition and enforcement of judgements or arbitral awards.

Jurisdiction

Jurisdiction means the right of a court or tribunal to hear a case. Courts have jurisdiction if a victim or wrongdoer lives within its area, or the damage occurred within its area. If neither one of these elements is present, a court will not hear the case or dispute. When dealing with cross-border damage – ie. a person from one state causes damage in another state – the question of jurisdiction is important, as courts cannot hear the case unless the wrongdoer is within the court's area. So if a South African (X) causes damage in Zimbabwe and returns to South Africa, the Zimbabwean court cannot hear the case unless X returns to Zimbabwe, nor can the South African court hear the case, as the incident did not occur in South Africa. This is because a court can only hear cases that happen within its own country.

There are exceptions to this, as when countries have entered into an extradition treaty, but extradition is normally used when the perpetrator has committed what is considered a serious crime on an international scale, eg. serial murders or genocide. It is, however, unheard of for a person to be extradited for committing a tort or delict. That means that a party exporting LMOs that have caused damage cannot be extradited if the damage caused is not so severe as to amount to a serious crime.

Where a company or person cannot be sued, the alternative is to sue the state, but where states are involved, the norm is that one cannot institute a claim against a state in a different country. For instance, a South African cannot sue the US in

a South African court unless it is in relation to a financial contract in which the US government took part. This is so because of state sovereignty, ie. all states are perceived as being equal, and one cannot be subjected to the jurisdiction of another without surrendering a fundamental right.[31] This gives immunity to a state in the same way that diplomats have immunity. For a state to be sued, it has to consent to the jurisdiction of the court, otherwise it cannot be sued. As mentioned above, extradition is an option, but where you have a regime based on state liability, it is obvious that extradition is not an option, as you cannot extradite a country.

The importance of jurisdiction has to be highlighted and is the main obstacle to the development of any liability regime. Therefore, if we are going to have a regime that is based on state liability, this has to be taken into consideration. Furthermore, the forum is also crucial. The forum refers to the place and court that can hear the dispute. Are claims under the regime to be heard in the local courts or other existing tribunals that have international standing, such as the International Court of Justice (ICJ)? Either way, jurisdiction will be a problem, as the ICJ only hears cases to which the specific countries have consented.[32] Therefore, if a dispute arose between countries X and Y in which an LMO from country X caused damage in country Y, the ICJ would not automatically hear the case. Firstly, both countries would have to notify the ICJ of their intention to be bound by the ruling of the court. Even where one party consents, the ICJ cannot hear the case until the other does.[33] Therefore, consent is at the cornerstone of all international tribunals dealing with inter-state disputes, and it is based on the principle of state sovereignty.

In light of all these obstacles, it is suggested that the liability regime should clearly state which court or tribunal has jurisdiction to hear any matter relating to the regime. Otherwise, members to the tribunal will opt not to give their consent for a particular claim to be made.

Recognition and enforcement of judgements or arbitral awards

Related to the question of jurisdiction is that of enforcement and recognition of judgements. Enforcement of a judgement means whether a judgement passed by a court can be honoured. For example, if court X passes judgement

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31 See Dugard J., *International Law: A South African Perspective*, 2nd ed. Cape Town: Juta, 2000.

32 *Ibid.* See also 'Information note on the International Court of Justice', available at http://www.icj-cij.org/icjwww/igeneralinformation/icjgnnot.html, accessed 12 November 2005.

33 Such consent could be implied, though, through for instance the actions of the party concerned.

that Y caused damage to Z and must pay R100, either Z voluntarily pays the amount or the court orders the sheriff to seize goods worth R100 that belong to Z.

Recognition of a judgement entails that a judgement passed in country X against a citizen of country Y cannot be enforced in country Y because of sovereign immunity; ie. a court in country X can only pass a judgement that is applicable in country X alone.

So such a judgement cannot be enforced in another country. However, certain countries enter into treaties that recognise each other's judgements. So if such treaties exist, a judgement passed in country X can be enforced in country Y. Such recognition only relates to the two countries; thus a judgement in country X, though recognised in country Y, is still not recognised in country Z if it is a non-party to the treaty.[34] This is a major hurdle in any liability regime, as a judgement is worthless if one cannot enforce it.

Determination of the applicable law

This relates to which law is applicable in a case where there is trans-boundary damage and international players. A typical question that a court or tribunal will have to ask is whether it should apply the law of the country of import or country of export. Usually some contracts contain a clause specifying which law should apply, but some do not. The question of applicable law is important, because legal systems and legal principles differ from country to country, and therefore it is possible to get differing decisions depending on which country's law applies.

Choice of instrument

The choice of instrument is also important in developing a liability regime, as the type of instrument used determines whether the regime is legally binding and enforceable. The options presented ranged from having a legally binding instrument from the onset; to guidelines, which are always non-binding (but can acquire binding status later on); to no instrument.[35]

The African Centre for Biosafety was of the opinion that a liability protocol

34 See comments in UNEP/CBD, *Synthesis of Information and Views Regarding Identification Requirements for Living Modified Organisms Intended for Direct Use as Food, Feed or for Processing*, paras. 103–4.

35 Industry and New Zealand supported this approach.

to the Cartagena Protocol was the best instrument and objected to the option of no instrument. However, coming up with a separate protocol on liability to the Cartagena Protocol could take time. Experience in negotiating other liability regimes can give an example of how difficult it is. For instance, the Basel Convention, which was established to regulate the trans-boundary movement of hazardous waste, has a Protocol on Liability and Compensation. This Protocol took more than 10 years to negotiate and was completed in 1999. As of 22 August 2005, the Basel Liability Protocol had not entered into force, as only 13 members had signed it and it requires a minimum of 20 members to ratify it before it comes into force.[36] This just goes to show the challenges that one faces when trying to implement a liability regime. It also highlights the point made earlier when discussing state liability, namely that states are reluctant to enter into agreements that will expose them to litigation.

Examples such as the Basel Liability Protocol also help in strategising as to which instrument ought to be used, because a non-binding instrument is more likely to be accepted than a binding one. Should parties negotiate a non-binding agreement and hope that its principles will later become binding through practice; or should they take the long and winding road of negotiating a binding instrument? It is suggested that the former is the best option, especially considering that time and resources are limited. Perhaps it should be recalled that some of the COP-MOP meetings almost failed to take place due to lack of funding. Furthermore, those countries that are deeply committed to having a liability and redress regime could then incorporate it into their legal systems and, by doing so, start the process of bringing life to the regime.

THE WTO AND THE CARTAGENA PROTOCOL

In negotiating the Cartagena Protocol, one has to take into consideration how it could clash with certain WTO agreements. The agreements that come to the fore in this regard are the SPS Agreement and the TBT Agreement. It seems that the clash between the Cartagena Protocol and these WTO Agreements revolves around certain issues, the most important of which is the interpretation of the precautionary principle. The preamble of the Cartagena Protocol clearly states that the Protocol is based on this principle, and article 11.8 of the Protocol embodies the precautionary principle by stating the following:

> Lack of scientific certainty due to insufficient relevant scientific information

36 See status of ratification, available at http://www.basel.int/ratif/frsetmain.php, accessed 15 November 2005.

> and knowledge regarding the extent of the potential adverse effects of a living modified organism on the conservation and sustainable use of biological diversity in the Party of import, taking also into account risks to human health, shall not prevent that Party from taking a decision, as appropriate, with regard to the import of that living modified organism intended for direct use as food or feed, or for processing, in order to avoid or minimize such potential adverse effects.

Article 10.6 of the Protocol, which applies to LMOs for release into the environment, is drafted along similar lines. This is in stark difference to the SPS Agreement, in that its article 5.7 clearly states the following:

> In cases where relevant scientific evidence is insufficient, a Member may provisionally adopt sanitary or phytosanitary measures on the basis of available pertinent information, including that from the relevant international organizations as well as from sanitary or phytosanitary measures applied by other Members. In such circumstances, Members shall seek to obtain the additional information necessary for a more objective assessment of risk and review the sanitary or phytosanitary measure accordingly within a reasonable period of time.

It is therefore clear that the two WTO Agreements and the Protocol have different interpretations of the precautionary principle. The first difference is that the Cartagena Protocol allows states to ban imports where there is scientific uncertainty, and this ban will last until the country feels that certainty has been arrived at. However, under the Protocol, these countries do not have the obligation to seek information necessary to reach scientific certainty.

In essence, any ban based on article 11.8 or 10.6 of the Protocol could be imposed indefinitely. In contrast, article 5.7 of the SPS Agreement allows countries to impose sanitary and phytosanitary measures on a provisional basis and imposes a duty on these countries to seek additional information necessary for a more objective risk assessment and to review the SPS measure within a reasonable time. In the Japan Varietals case,[37] the AB ruled that an SPS measure cannot be maintained unless the party imposing it seeks to obtain the additional information necessary for a more objective assessment of risk, and reviews the measure accordingly within a reasonable period of time. So any member imposing a ban is obliged to seek further information and to review the measure within

37 WTO, *Japan – Measures Affecting Agricultural Products*, WT/DS76/R, 27 October 1998, and WT/DS76/AB/R, 22 February 1999.

a reasonable time. However, under the Protocol, countries are not obligated to do so.

Furthermore, the SPS Agreement does not allow the adoption of a measure simply because there is scientific uncertainty, whereas the Cartagena Protocol does. Under the SPS Agreement, such measures can only be adopted if there is scientific insufficiency and not when there is scientific uncertainty, and this was confirmed in the Japan Apples case.[38] In this case, the AB ruled further that scientific evidence is insufficient when 'the body of available scientific evidence does not allow, in quantitative or qualitative terms, the performance of an adequate assessment of risks as required under Article 5.1 and as defined in Annex A to the SPS Agreement', and that the terms 'scientific uncertainty' and 'scientific inefficiency' are not interchangeable. It is therefore clear that when a measure is adopted under the Protocol on the basis that there is scientific uncertainty, such measure could be in conflict with the WTO's SPS Agreement.

The SPS Agreement also requires states to base their measures on standards set up by recognised international organisations and to look at measures of other countries when imposing SPS measures. This is clear from article 4,[39] as well as article 5.7. The international organisations that come to mind are the Codex Alimentarius Commission, the International Office of Epizootics (OIE) and the IPPC. However, it seems that these organisations are currently of no help, as they are still setting the standards on LMOs. The Codex has set up a Task Force on Foods Derived from Biotechnology, which is currently working on, among other things, principles for risk analysis of foods derived from modern biotechnology. It has also formed the Committee on General Principles, which is elaborating draft working principles for risk analysis. The Committee on Food Labelling is preparing recommendations for the labelling of food obtained through biotechnology. So all this work is still in progress.

Under the IPPC, an exploratory open-ended working group was set up to address issues of GMOs, biosafety and invasive species, and it has recommended the development of a supplementary standard to specifically address the plant pest risks of LMOs/products of modern biotechnology, as a matter of urgency.

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38 WTO, *Japan – Measures Affecting the Importation of Apples*, WT/DS245/AB/R. The case involved a complaint by the US concerning certain requirements and prohibitions imposed by Japan with respect to the importation of apples from the US.

39 Article 4.1 of the SPS Agreement states: 'Members shall accept the sanitary or phytosanitary measures of other Members as equivalent, even if these measures differ from their own or from those used by other Members trading in the same product, if the exporting Member objectively demonstrates to the importing Member that its measures achieve the importing Member's appropriate level of sanitary or phytosanitary protection.'

This is to include a review of plant pest risks associated with LMOs/products of modern biotechnology carried out in co-operation with the CBD. The OIE Standards Commission has had an Ad Hoc Working Group on Biotechnology since 1996, but has not yet adopted any international standards in this field. The million dollar question is, if these organisations do set up standards that do not favour either the EU or the US, will these countries accept the standards or will they try to play down the role of these standards? Article 2.1 of the Cartagena Protocol also '[encourages] member states to take into account, as appropriate, available expertise, instruments and work undertaken in international forums with competence in the area of risks to human health.' Thus the language in the Protocol is not mandatory, while that in the SPS Agreement seems to be of a stronger nature.

It also seems that requirements for labelling under article 18 of the Cartagena Protocol could contravene the TBT Agreement. Under article 2.1 of this agreement, member countries should not discriminate between 'like' products of domestic or foreign origin, and under article 2.2, such regulations should not create unnecessary obstacles to trade, neither should they be more trade-restrictive than is necessary to fulfil a legitimate objective such as protecting plant life or health. It remains to be seen whether LMOs are considered 'like' products in relation to conventional products. If they are, then there are no grounds for applying any special treatment to them, including mandatory labelling schemes. According to Isaac and Kerr,[40] whereas laws regulating and protecting the environment usually focus on the process and production methods, most WTO agreements tend to focus on end-use criteria in distinguishing products. Thus, under the former rules, to determine if specific products are like products, one will look at how they were made, while under the WTO, the criterion is whether their end use is the same. This is to avoid discrimination among states with different levels of development, as developed countries can use environmental regulations as trade barriers by stating that products made in a way that is not environmentally friendly could not be imported. This approach is in line with the decision of the Tuna-Dolphin and Shrimp-Turtle cases of the WTO. So it is most likely that GMOs and non-GMO varieties of a plant will be seen as like products if end-use criteria are used.

Finally, since there is a conflict between WTO rules and the Cartagena Protocol, the inevitable question that is asked is which one of the two prevails over the other. This question is part of the further debate of the relationship between

40 Isaac G.E. & W.A. Kerr, 'Genetically modified organisms and the World Trade Organisation: A harvest of trouble', *Journal of World Trade*, 37, 6, November–December 2003, p. 1090.

the WTO agreements and other multilateral environmental agreements. At the Doha Ministerial Conference, the relationship between WTO agreements and multilateral environmental agreements was identified as a key issue for negotiations for the Cancun Ministerial Conference; however, no progress was made in this regard, as the talks collapsed. And currently, the issue does not seem to have been resurrected at the Hong Kong Ministerial Conference, so it is still unclear what the rules are under the WTO.

Still, one has to note that under the rules of interpretation of treaties, a treaty that deals with a specific issue always prevails over a general one. This means that the Cartagena Protocol will prevail over the WTO agreements, as it is more specific; ie. it deals with rules regulating the trans-boundary movement of GMOs, while, for instance, the SPS Agreement applies to a lot more products, including LMOs. Another rule in interpreting treaties is that a country that is not a signatory to a treaty is not bound by the rules of that treaty. This means that in the GM dispute between the EU and the US and other states, the EU cannot rely on the rules of the Protocol to justify its ban, as the US is not a party to the Protocol. The EU has done this, nonetheless, and it remains to be seen how the WTO Panel will rule on this issue.

In conclusion, therefore, it is evident that rules under the WTO and the Cartagena Protocol are in conflict. This is not surprising, as the WTO rules aim at reducing trade restrictions and thus encouraging trade, while the primary goal of the Protocol is to protect biodiversity. This environment–trade conflict is not new, as we have seen how the WTO has been criticised for being environmentally insensitive. Still, countries that are determined to implement the Protocol cannot ignore the WTO rules, as the WTO has a dispute settlement mechanism, while the Protocol still does not – at least as of now. Thus, if any measures undertaken under the Protocol are seen to be against WTO rules, countries implementing them could be dragged to the WTO Dispute Settlement Panel, and this would inevitably mean spending money. Thus, poor countries that cannot afford these fees need to look at their negotiating positions properly and try to take positions that are also in line with WTO rules. Rich countries such as the EU could afford to ignore WTO rules, because they are prepared to pay fines that the WTO imposes, or to defy the WTO, as in the Beef Hormones case. Furthermore, the GMO case at the WTO is a litmus test for the Protocol, because if the EU wins, then that is a thumbs up for the Protocol, but if the US and its counterparts win, then this will inevitably be a blow to the Protocol, as its principles will be severely challenged. The importance of this case can therefore not be underestimated.

CONCLUSION

In conclusion, it should be stressed that all these issue (damage, causation, channelling of liability) are interlinked, so they have to be looked at as a whole. For instance, the geographical scope of damage will depend on the kind of procedure chosen for settling claims. Therefore, if the scope is going to be within and beyond the national jurisdiction of member states, then the form of procedure that has to be chosen has to be an inter-state procedure, because civil procedures will only apply within the country's territory and not elsewhere. Another example is that where there has to be causation, one cannot channel liability to a predetermined party. It will only be channelled to the party that is causally linked to the damage.

Furthermore, when choosing a regime, it is necessary that the legal principles should be feasible and in line with already established standards, as precedent plays a large role in most, if not all, legal systems. Therefore, trying to depart too much from some of the already existing norms in legal systems will only make it even harder for the liability regime to be accepted and completed.

Chapter 6

Food Aid: A Regional Study of Southern Africa

Catherine Grant[1]

INTRODUCTION

Food aid is a complex, multifaceted subject. Even the Food and Agriculture Organisation (FAO) of the UN notes that 'defining international food aid and describing its role continue to be widely debated topics'.[2] For the purposes of this research, food aid is defined as 'international transactions that result in the provision of aid in the form of a food commodity in a country deemed in need of receiving such aid'.[3]

At face value, it is often assumed that food aid is a simple tool used to provide humanitarian assistance to those in need. This is not necessarily the case, however, and the history of food aid tells a different tale. Food aid was used in the early 1950s as a means to dispose of surpluses of certain commodities produced in the US. This was borne out by the strong link between food aid shipments and world cereal prices.[4]

The FAO adopted a policy to ensure the absorption of these surpluses by increasing consumption in developing countries, with the aim of causing as little disruption to international trade as possible.[5] One of the primary bodies still operating in the area of food aid today is known as the FAO Consultative Subcommittee on Surplus Disposal (CSSD). It took a number of years for food aid to move away from its primary role of surplus disposal towards its more-common usage today as a means to address humanitarian needs in developing countries. The WFP was only established in 1962, and multilateral food aid distribution under the auspices of the UN was started shortly thereafter. In 1967 the first Food Aid Convention (FAC) was adopted. It was 'intended to enhance the capacity

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1 CATHERINE GRANT is a Research Associate of SAIIA.

2 FAO, *FAO Trade Policy Technical Notes on Issues Related to the WTO Negotiations on Agriculture, No. 8: Food Aid in the Context of International and Domestic Markets and the Doha Round.* Rome: FAO, 2005, p. 1.

3 *Ibid.*

4 Webb P., *Food as Aid: Trends, Needs and Challenges in the 21st Century.* Occasional Papers No. 14. Rome: WFP, 2003, p. 2.

5 Konandreas P., *Multilateral Mechanisms Governing Food Aid and the Need for an Enhanced Role of the CSSD in the Context of the New WTO Disciplines on Agriculture.* Geneva: FAO, 2005, p. 2.

of the international community to respond to food aid needs by guaranteeing a predictable flow of food aid per year'.[6]

Given this early focus on surplus disposal as the reason for the supply of food aid, it is not surprising that particular attention has been given to the impact of food aid on global trade. During the Uruguay Round of negotiations under the GATT, food aid was addressed as part of the discussion on agricultural trade. The result was the inclusion of article 10.4 in the WTO Agreement on Agriculture. This provision sought to ensure that there was no linkage between the provision of food aid and commercial exports.

The provisions of the FAO Principles on Surplus Disposal and Consultative Obligations, as well as the FAC, were specifically referred to in the text. In some ways, therefore, the WTO recognised the authority of these other multilateral organisations (CSSD and FAC) with regard to food aid policy. Also of relevance in the Uruguay Round Agreement was the Marrakesh Decision on Least-developed and Net Food-Importing Developing Countries (NFIDCs). This too contains specific text on food aid.

New WTO disciplines on food aid are now being considered as part of the Doha Round of negotiations. Food aid is one of the issues being discussed under the export competition pillar, together with export subsidies, export credits and state trading enterprises. It is as part of this debate that this chapter seeks to make a contribution by considering the implications of new disciplines on food aid for the Southern African region.

The following section provides an overview of the food security and food aid situation in the region. This is necessary in order to place the rest of the paper in the proper context. Sections 3 and 4 expand on the debate taking place in the WTO, as well as the role of other multilateral bodies mentioned above – WFP, CSSD and FAC. The issue of GM food is then considered, as this is a key component in current discussions on food security in the Southern African region. The chapter concludes with a study of two cases – Lesotho and Zambia.

OVERVIEW

Food security in Southern Africa

Food security is a complex issue and one that it is not possible to explore in too much detail here. The World Food Summit 1996 defined food security as a situation when 'All people, at all times, have physical, social and economic

6 *Ibid.*, p. 4.

access to sufficient safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life.' There are four key conditions that all need to be fulfilled in order to achieve a state of food security. These are:

Availability: Food supplies must be sufficient to adequately feed the population.

Access: All people must have physical, social and economic access to sufficient food.

Stability: Access and availability must be ensured at all times.

Effective utilisation: The food consumed must be safe and nutritious.[7]

In general, Southern Africa remains vulnerable to food insecurity, for a number of reasons. Firstly, weather conditions can have a large impact on the agricultural productivity of the region. Droughts and floods are common in some countries and often result in large numbers of people going without food. Secondly, production levels in the agricultural sector in Southern Africa are generally much lower than those in other parts of the world. This is due to the methods of farming used, as well as the environmental conditions. Thirdly, many people in the region rely on subsistence farming for the provision of food. Whether or not a household is vulnerable to food insecurity is often assessed in the region on the basis of its ability to produce food. Fourthly, high levels of poverty in the region have a negative impact on the ability of people to purchase food when they are not in a position to have produced it themselves. Fifthly, the HIV/AIDS pandemic has had an impact on food security in the region. People who are afflicted by the disease are often not in a position to farm, and therefore there has been a reduction in the available labour force for the agricultural sector. Orphans and households headed by children and women are also found to be more vulnerable to food insecurity. Sixthly, some have even attributed food insecurity to the high levels of debt among governments in the region, including those of Zambia, Malawi and Mozambique.[8] Seventhly, armed conflict and political unrest have contributed to food insecurity in the region and are among the leading causes of world hunger.[9]

Some have called the combination of the key factors listed above the 'triple threat'. CARE list the factors as follows:

> repeated poor harvests due to erratic rainfall; high prevalence of HIV, and

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7 Lesotho, *Lesotho Food Security Policy*. Maseru, 22 March 2005, p. 7.

8 Lambrechts K. & G. Barry, *Why Is Southern Africa Hungry? The Roots of Southern Africa's Food Crisis*. Christian Aid policy briefing, June 2003, p. 15.

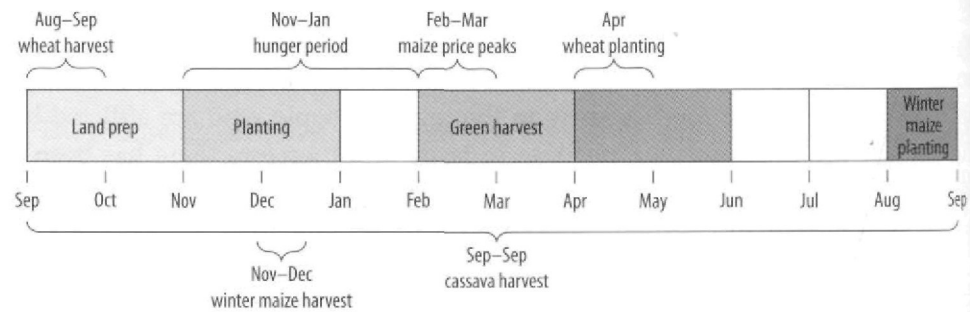
9 FAO, *Armed Conflicts Leading Cause of World Hunger*. Rome: FAO, 23 May 2005a, p. 1.

growing impact of the AIDS epidemic on the abilities of people to farm or engage in other productive activities; and weakening capacity of governments in the region to respond.[10]

As noted above, underlying poverty is also considered to be a major factor in the ongoing lack of food security in the region. This suggests that food insecurity is not a short-term phenomenon related to emergency situations, but is rather a long-term issue that must be addressed in a way that takes into account the underlying causes, such as poverty and HIV/AIDS.

Overall maize production in the SADC region doubled in the 43 years from 1961 to 2004.[11] This is dominated by South Africa, which accounts for 49% of total maize production in the region. Production of maize in SADC countries does tend to be fairly variable, however, and depends largely on weather conditions. Another factor affecting food security in Southern Africa that is of relevance to food aid is the seasonal nature of the availability of food in the region. Figure 1, taken from FEWS NET Zambia's monthly report, illustrates the usual pattern with regard to planting and harvesting in the region.[12] The 'hunger period' normally peaks between January and March each year.

Figure 1: Southern Africa's usual planting and harvesting pattern



Source: FEWS NET Southern Africa, Southern Africa: Food Security Update March/April 2006. Pretoria: FEWS NET Southern Africa, 2006a, p. 1.

10 CARE, *Southern African Food Crisis: More than just Food Aid*, 1 December 2005, p. 1, available at http://www.care.de/uploads/media/051201_southern-africa-food-crisis_more-than-just-food-aid.pdf, accessed 10 May 2006.

11 Vink N. *et al.*, 'Promoting agricultural trade and investment synergies between South Africa and other SADC member countries.' *Internal memorandum of the University of Stellenbosch*, South Africa, April 2006, p. 2.

12 FEWS NET Zambia, *Zambia: Food Security Update March 2006*. Lusaka: FEWS NET Zambia, 2006.

Assessments of food security in Southern Africa for the consumption period 2006/07 indicate a more positive picture than in recent years. The number of food insecure people in the region has dropped from 10 million to 3 million.[13] FEWS NET Southern Africa attributes the improvement to higher than average rainfall in much of the region.[14] Production levels were positive, with good harvests in many parts of the region, including Malawi, Zambia and Zimbabwe.[15] Swaziland did not register an increase in production, with output remaining the same as the previous year. Zimbabwe will continue to face major food problems, including food access issues for those who rely on the market, due to continuously increasing prices. South African maize production for the period is also set to decline, due to a marked reduction in the area planted, coupled with a delayed start to the 2005/06 season in many parts of the country. Grains SA explained that the large surplus in 2005 required efforts to balance supply in order to keep prices stable. Price is the driving force behind the decisions made by South African farmers about what and how much of each crop to plant. The lower South African harvest will have some impact on the regional availability of maize, and the result was expected to be a much larger regional deficit in 2006.[16]

Food aid in Southern Africa

Due to the food security difficulties faced by the Southern African region, the provision of food aid has become a regular occurrence in many countries. Most recently, there was the Southern African food crisis of 2002/03, when much of the region was hit by a severe drought. At that time, there was also flooding in other places and political instability in Zimbabwe following the implementation of the fast-track land reform programme. De Villiers notes that Southern Africa was suddenly brought into the focus of the food aid fraternity.[17] Nearly 13 million people were estimated to be at risk of facing extreme food shortages, with Zimbabwe, Malawi and Zambia being particularly affected.[18] The WFP estimated that the regional shortfall would be 4 million metric tonnes of food during 2003, and around 1.2 million metric tonnes was distributed as food aid

13 FEWS NET Southern Africa, *Southern Africa: Food Security Update September/October 2006.* Pretoria: FEWS NET Southern Africa, 2006b, p. 1.

14 FEWS NET Southern Africa, *Southern Africa: Food Security Update March/April 2006.* Pretoria: FEWS NET Southern Africa, 2006a, p. 1

15 FEWS NET Southern Africa, 2006b, *op. cit.*, p. 1.

16 *Ibid.*, p. 3. This chapter was written before figures for 2006 became available.

17 De Villiers J., 'Food aid in Southern Africa.' *Unpublished paper,* Pretoria, 5 November 2003.

18 OXFAM, *Crisis in Southern Africa.* OXFAM Briefing Paper No. 23, June. UK: OXFAM International, 2002, p. 2.

in that year.[19] For the first time, HIV/AIDS was raised together with the issue of food security. The WFP incorporated HIV/AIDS into all its interventions in 2003.[20]

There are a number of key statistics about food aid at a global level and in Southern Africa that are worth highlighting. These are largely based on data from the WFP Interfais report for 2004, which brings together information on food aid deliveries and contributions from a range of sources, not just the WFP itself.[21] The Interfais report shows regional data at the sub-Saharan Africa level, so in some cases it was difficult to get exact statistics for Southern Africa alone.

The WFP Global Food Aid Profile for 2001–04 is set out below as a summary of some of the key markers related to food aid. As can be seen, global food aid reduced significantly in 2004 to an estimated 7.5 million metric tonnes. Of that, just under half was distributed by the WFP, and most of it was in the form of cereals. Sub-Saharan Africa received 50.8% of global food aid, which was mainly in the form of relief or emergency assistance. Food aid represents less than 5% of global overseas development assistance.[22]

The three categories of food aid indicated are emergency or relief, programme and project food aid. Emergency or relief food aid is defined as food aid provided for direct distribution at times of severe food shortages.[23] Programme food aid largely represents resource transfers in the form of food for balance of payment support, and project food aid represents transfers of food commodities either for distribution to targeted groups for development purposes or for monetisation to fund other food security-related work.[24] Emergency food aid is considered to have the least market-distorting impact and programme food aid the most, because all of it is monetised in the open market.[25] The acronym LFIDCs used in the WFP Global Food Aid Profile refers to low-income food deficit countries. In the Southern African region, this includes Angola, the DRC, Lesotho, Madagascar, Malawi, Mozambique, Swaziland, Tanzania, Zambia and Zimbabwe.[26] Total cereal food aid amounted to 0.3% of total production and 2.8% of world imports in 2004. Sub-Saharan Africa received 87% of its food aid deliveries as cereals.

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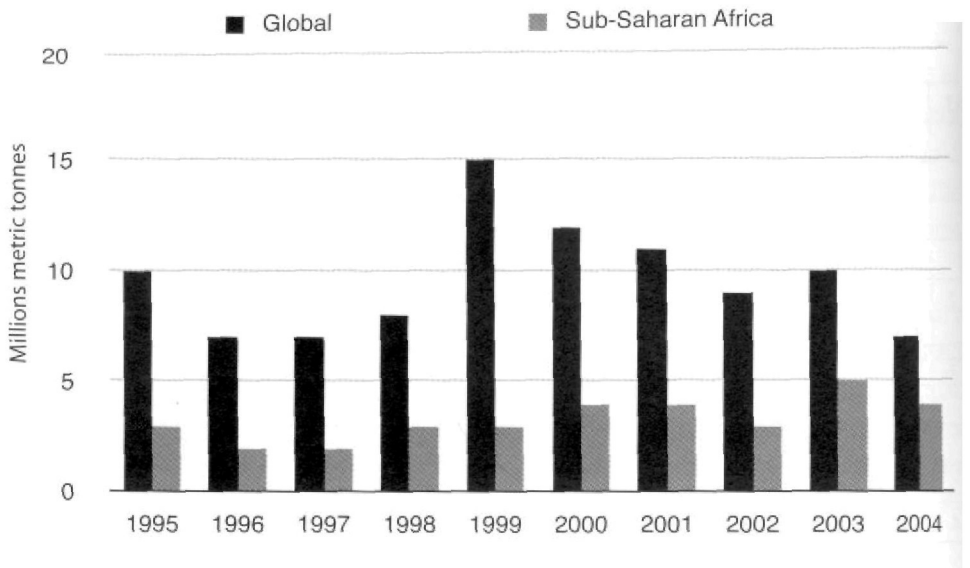
19 *Ibid.*, p. 3.
20 WFP, *WFP Annual Report 2003*. Rome: WFP, 2004, p. 27.
21 WFP, *The Food Aid Monitor: 2004 Food Aid Flows*. Rome: WFP, 2005a.
22 Barrett C. & D. Maxwell, 'Towards a global food aid compact.' Revised version at December 2005 of a chapter to be published in the forthcoming book, 'Food Policy'.
23 FAO, 2005, *op. cit.*, p. 3.
24 *Ibid.*
25 *Ibid.*
26 WFP, *WFP in Stats 2004*. Rome: WFP, 2005b, p. 4.

Table 1: World food aid profile, 2001–04

		2001	2002	2003	2004
		Food aid (million tons)			
1.	**Total food aid**	**10.98**	**9.77**	**10.29**	**7.50**
	WFP share of total	4.5	3.8	4.9	3.7
	Cereals	9.5	8.1	8.9	6.5
	Non-cereals	1.5	1.5	1.3	1.0
		Percentages of global food aid			
2.	**Procurement in developing countries/territories in transition**	**11.6**	**10.6**	**22.4**	**25.9**
3.	**Deliveries by channel**				
	Bilateral	28.3	31.3	21.4	20.6
	Multilateral	41.5	40.1	48.9	52.0
	NGOs	30.5	28.5	29.8	27.4
4.	**Food aid deliveries by category**				
	Programme	20.9	21.7	11.0	13.9
	Relief	50.6	49.0	66.8	58.0
	Project	28.5	29.3	22.2	28.1
5.	**Food aid deliveries by region**				
	Sub-Saharan Africa	33.6	30.5	52.7	50.8
	South and east Asia	37.2	38.4	22.4	26.4
	Europe and CIS	11.9	10.9	6.9	6.1
	Latin America and the Caribbean	9.0	12.9	4.3	8.7
	North Africa and Middle East	8.2	7.3	13.7	8.0
6.	**Deliveries to:**				
	Developing countries	97.6	98.7	97.3	99.1
	LIFDCs	82.9	85.1	85.5	71.1
	LDCs	42.4	39.0	51.6	46.6
7.	**Total cereal food aid deliveries as a percentage of:**				
	World cereal production	0.5	0.4	0.5	0.3
	World cereal imports	3.9	3.3	3.7	2.8
8.	**Cereals food aid deliveries to LIFDCs expressed as a percentage of:**				
	LIFDC cereal production	1.0	0.9	1.0	0.7
	LIFDC cereal import	9.5	8.5	9.9	6.5-

Source: WFP, 2005b, op. cit.

Figure 2: Global food aid deliveries, 1995–2004



Source: WFP, 2005a, op. cit.

Table 2: Food aid deliveries by recipient countries in Southern Africa, 2000–04 (metric tonnes)

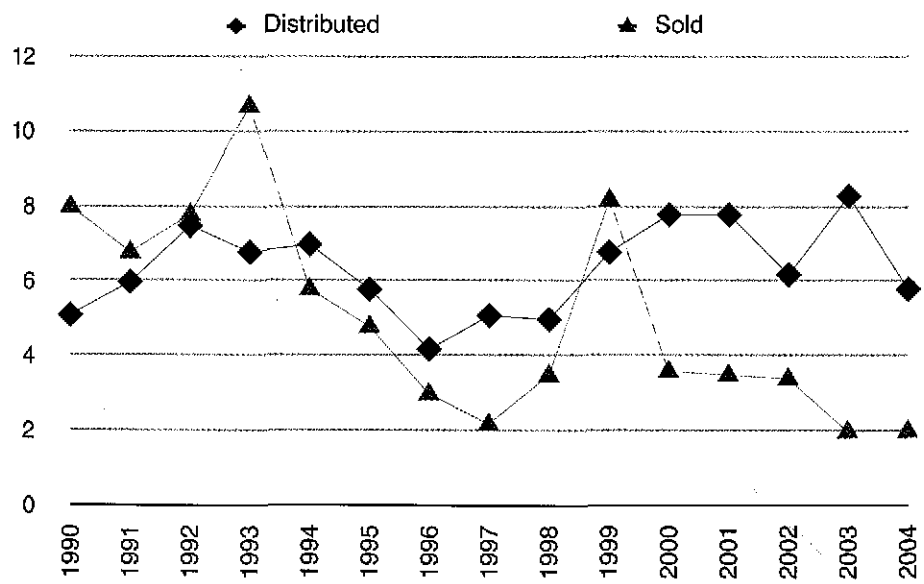
Country	2000	2001	2002	2003	2004
Angola	296,100	193,800	264,000	300,900	120,600
DRC	73,500	47,000	90,800	89,000	99,500
Lesotho	6,300	3,400	57,500	28,400	45,800
Madagascar	43,500	59,600	47,200	52,800	52,600
Malawi	36,300	41,600	198,100	119,400	52,800
Mozambique	185,200	263,300	200,800	243,900	158,400
Namibia	2,000	4,500	23,700	23,200	6,000
South Africa	3,000	100	15,100	79,500	0
Swaziland	0	0	15,500	24,200	13,000
Tanzania	62,900	184,500	93,000	131,900	125,500
Zambia	49,500	45,300	69,300	150,300	115,300
Zimbabwe	14,800	0	255,400	353,300	273,700

Source: WFP, 2005a, op. cit.

Categories of food aid

In 2004 emergency or relief food aid involved the delivery of 4.4 million metric tonnes or 58% of total food aid. Project food aid made up another 28%, with programme food aid only 14% of the global total. Figure 3 shows the deliveries to sub-Saharan Africa by category in 1990–2004. Emergency food aid (73%) remains the largest category, with programme food aid (6%) slowly declining as project food aid (21%) stabilises. The move away from programme food aid is seen by some as having a destabilising effect on food aid supplies, as emergency food aid is a much-more-unpredictable category.

Figure 3: Food aid deliveries to sub-Saharan Africa by category, 1990–2004 (millions of metric tonnes)



Source: WFP, 2005a, op. cit.

In Southern Africa, Zimbabwe was the major recipient of emergency food aid in 2004 (273,000 metric tonnes), as had been the case in 2003. Zambia (79,000 metric tonnes) and Mozambique (75,000 metric tonnes) were among the top nine recipients of project food aid. No Southern African country was among the top recipients of programme food aid. Angola was the most consistent recipient country over the last 10 years. Levels of food aid to Southern Africa are declining after a peak in 2003. They are still much higher, however, than those

of the late 1990s, when approximately 500,000–700,000 tonnes were provided to the region.

Major food aid donors

In 2004, 57% of food aid deliveries were financed by the US, 20% by the EU (European Commission and member states), 8% by Japan, 3% each by the Republic of Korea and Canada, and 2% by China and Australia. All major donors, with the exception of Japan, Australia and the Netherlands, reduced their contributions to food aid in 2004.[27] China and India are emerging donors in the area of food aid as they learn to cope with the problem of disposing of large grain surpluses.[28] Table 3 provides more information on their global activities.

Table 3: Global food aid profile of the main donors, 2004 (%)

	Australia	Canada	China	European Commission & EU	Germany	Japan	Republic of Korea	USA
FOOD AID CATEGORY								
Emergency	38	36	99	95	46	62	100	48
Project	60	67	1	5	54	3	–	33
Programme	2	–	–	–	–	35	–	19
COMMODITY								
Cereals	95	85	100	88	83	94	100	86
Non-cereals	5	15	–	12	17	6	–	14
SALE								
Distributed	98	74	100	100	100	67	100	61
Sold	2	26	–	–	–	33	–	39
RECIPIENT REGION								
Sub-Saharan Africa	16	42	1	74	64	39	1	53

27 WFP, 2005a, *op. cit.*, p. xi.
28 Webb P, *op. cit.*, p. 5.

	Ausralia	Canada	China	European Commission & EU	Germany	Japan	Republic of Korea	USA
Middle East & North Africa	1	3	–	10	9	15	–	8
Eastern Europe & CIS	–	–	–	7	5	4	–	9
Latin American & the Caribbean	–	4	–	2	1	1	–	13
TERM								
Grant	100	100	100	100	100	100	4	95
Concessional sales	–	–	–	–	–	–	96	5
CHANNEL								
Bilateral	2	5	99	7	11	38	97	20
Multilateral	70	67	1	79	73	62	3	39
NGOs	28	28	–	14	16	–	–	41
MODE								
Direct transfer	82	83	99	11	11	58	99	99
Local purchase	11	14	0.5	47	61	7	–	0.5
Triangular transaction	7	3	0.5	42	28	35	1	0.5

CIS = Commonwealth of Independent States
Source: WFP, 2005a, op. cit.

The US is the largest donor to sub-Saharan Africa, accounting for nearly two-thirds of all food aid deliveries (2.3 million metric tonnes). It is followed by the EC and the EU member states, who together nearly contributed 1 million metric tonnes in food aid to sub-Saharan Africa in 2004. Other smaller donors to the region include Japan, Canada, Norway, Australia and NGOs.

Channels for food aid

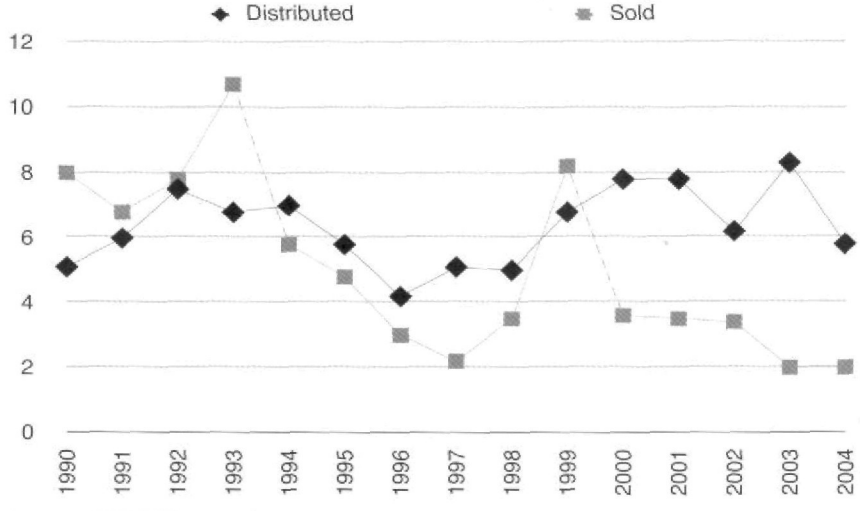
Over half (51%) of global food aid deliveries were provided through multilateral channels in 2004. Of this amount, 97% went through the WFP. Of the remaining amount, 28% was distributed by NGOs and 21% was delivered on a bilateral

basis.[29] In sub-Saharan Africa, a greater proportion of food aid was provided multilaterally, with 63% being delivered via this channel. NGOs accounted for 29%, and only 8% was delivered bilaterally (a level that is notably lower than the global percentage).

Monetisation and grant basis

In 2004, 2 million metric tonnes (29%) of food aid was sold, and 5.5 million metric tonnes was actually distributed to final beneficiaries.[30] Most of the food aid sales were carried out by NGOs or as a result of bilateral donations to governments. Figure 4 clearly shows that the practice of monetisation is declining, with more food aid being distributed rather than sold.

Figure 4: Food aid deliveries by market sales, 1990–2004 (millions of metric tonnes)



Source: WFP, 2005a, op. cit.

Only 14% of the food aid delivered to sub-Saharan Africa was sold on the market, which was a much lower figure than the global amount.[31] The vast majority of food aid in the region was delivered to targeted beneficiaries.

Most (7.1 million metric tonnes) of the food aid in 2004 was delivered on a fully grant basis, with only 0.4 million metric tonnes provided on concessional

29 WFP, 2005a, *op. cit.*, p. xi.
30 *Ibid.*
31 *Ibid*, p. 7.

terms.[32] The majority of concessional sales were that of food aid provided by the US and Republic of Korea in Asia. No food aid delivered to sub-Saharan Africa was provided as concessional sales, meaning that in 2004 the food aid to sub-Saharan Africa was delivered fully on a grant basis.[33]

WFP procurement in Southern Africa, 2001–04

In 2004 the deliveries of food aid from local and triangular purchases in developing countries reached 21% of total food aid or 1.6 million metric tonnes.[34] In sub-Saharan Africa, 20% of food aid was delivered through local purchases and 11% through triangular transactions – a total of 31%. The remaining 69% of food aid was transferred directly from the donor countries.[35]

The amounts procured in Southern Africa by the WFP are shown in Table 4. In 2004 Southern Africa accounted for approximately one-fifth of the food procured in developing countries by the WFP.

Table 4: Food aid procured in Southern Africa by the WFP, 2001–04 (metric tonnes)

Country	2001	2002	2003	2004
Angola	7,132	4,600	3,863	532
Botswana	0	1,500	0	0
DRC	642	382	2,220	844
Lesotho	2,425	8,080	6,069	35,738
Madagascar	2,175	1,238	1,936	723
Malawi	18,925	6,703	26,002	17,482
Mozambique	14,192	13,183	16,750	17,495
Namibia	1,686	214	2,747	5,447
South Africa	60,779	245,348	324,625	107,562
Swaziland	0	0	0	2,467
Tanzania	45,523	58,169	60,441	38,587
Zambia	24,583	12,120	61,973	85,002
Zimbabwe	28	220	7,416	6,788

Source: WFP, 2005b, op. cit.

32 *Ibid.*, p. xi.
33 *Ibid.*, p. 7.
34 *Ibid.*, p. xi.
35 *Ibid.*, p. 7.

There is no overall trend indicated by the WFP procurements in Southern Africa between 2001 and 2004. The amounts purchased vary greatly from year to year in most cases. It is interesting to note that there has been a fairly steady increase in the amount procured in Lesotho, Mozambique and Zambia.

South Africa is the largest provider of food to the WFP in the region and in 2004 was the ninth-largest source of food in the world. There was a significant decrease in the amount purchased in 2004 as compared to 2002 and 2003. This may reflect in part the large amounts of food aid needed in 2002 and 2003, due to the Southern African crisis discussed above. As compared to other regions, Southern Africa has a fairly high level of regional procurement and a diverse range of source countries.

WTO DISCIPLINES ON FOOD AID

The trade impact of food aid was addressed in the Uruguay Round Agreement as part of the discussions on export competition. The result was the inclusion of article 10.4 in the Agreement on Agriculture. This provision states:

Members donors of international food aid shall ensure:

1. that the provision of international food aid is not tied directly or indirectly to commercial exports of agricultural products to recipient countries;
2. that international food aid transactions, including bilateral food aid which is monetized, shall be carried out in accordance with the FAO 'Principles of Surplus Disposal and Consultative Obligations' including, where appropriate, the system of Usual Marketing Requirements (UMRs); and
3. that such aid shall be provided to the extent possible in fully grant form or on terms no less concessional than those provided for in Article IV of the Food Aid Convention 1986.[36]

Also of relevance are article 16 of the Agreement on Agriculture and the Marrakesh Decision on Measures Concerning the Possible Negative Effects of the Reform Programme on LDCs and NFIDCs. The Marrakesh Decision

> recognises that while the progressive implementation of the results of the Uruguay Round as a whole will generate increasing opportunities for trade expansion and economic growth to the benefit of all members, during the reform programme LDCs and NFIDCs may experience negative effects in terms of the availability of adequate supplies of basic foodstuffs from external sources on reasonable terms and conditions.[37]

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36 WTO, *Agreement on Agriculture*. Geneva: WTO, 1995a.

37 WTO, *Marrakesh Decision on Measures Concerning the Possible Negative Effects of the Reform*

Paragraphs 3 and 16 of the Marrakesh Decision refer to food aid. Paragraph 3(i) calls for a review of the level of food aid established under the FAC 1986. In paragraph 3(ii), ministers agreed to adopt guidelines to ensure that an increasing amount of food aid would be in fully grant form in line with article IV of the FAC 1986.

It is interesting to note that article 10.4 of the Agreement on Agriculture makes explicit reference to the FAO Principles and the FAC. This is significant, because 'the Principles and the Food Aid Convention became part of the rights and obligations of WTO members under the legal framework of the WTO'.[38] There were, however, no provisions put in place to operationalise the relationship between the WTO and the other two agreements. No formal linkage between the WTO Committee on Agriculture and the FAO CSSD or the FAC Secretariat was specified.[39]

The Marrakesh Decision has also experienced problems with regard to its implementation. Little has been done to address the concerns raised by LDCs and NFIDCs. The minimum guaranteed volume of food aid under the FAC was last reviewed in 1999 and has in fact been declining since 1995. The 1999 level of donor commitments was the lowest in 33 years.[40] There has also not been any real progress towards a multilateral commitment to increase the amount of food aid made in fully grant form, despite the efforts of a number of individual donor countries to move in this direction. The lack of implementation of the Marrakesh Decision has been raised by a number of developing country members of the WTO as part of the so-called 'implementation debate'. To date, there has been little real engagement on the issue by WTO members.

Food aid is again on the agenda of the WTO negotiations under the pillar of export competition, together with export subsidies, export credits and state trading enterprises. The July 2004 Framework, paragraph 18 of Annex A, covered all forms of export subsidisation and included the following provision on food aid:

> 18. The following will be eliminated by the end date to be agreed:
>
> Provision of food aid that is not in conformity with operationally effective disciplines to be agreed. The objective of such disciplines will be to prevent commercial displacement. The role of the international organisations as

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Programme on Least-Developed and Net Food-Importing Developing Countries. Geneva: WTO, 1995b, p. 1.

38 Konandreas P., *op. cit.*, p. 6.

39 *Ibid.*

40 Young L.M. & P.C. Abbott, 'The WTO negotiations and disciplines for food aid', *Bridges*, 5, May 2005. Geneva: ICTSD, 2005.

> regards the provision of food aid by Members, including related humanitarian and development issues, will be addressed in the negotiations. The question of providing food aid exclusively in fully grant form will also be addressed in negotiations.[41]

The July Framework required that the elimination of food aid that does not conform to the disciplines to be agreed be done in 'parallel' with the elimination of other forms of export subsidisation. This concept of parallelism is considered to be extremely important for a number of WTO members. It did in fact ensure that food aid was at the forefront of discussions at the WTO Ministerial Conference in Hong Kong in December 2005. At this meeting, pressure was brought to bear on members to agree to a date for the elimination of export subsidies. This was not an easy issue for the EU in particular, and in response it argued that negotiations on food aid, export credits and state trading enterprises must also be advanced. The result was the inclusion of paragraph 6 in the Hong Kong Ministerial Declaration:

> 6. We agree to ensure the parallel elimination of all forms of export subsidies and disciplines on all export measures with equivalent effect to be completed by the end of 2013. This will be achieved in a progressive and parallel manner, to be specified in the modalities, so that a substantial part is realized by the end of the first half of the implementation period ... On food aid, we reconfirm our commitment to maintain an adequate level and to take into account the interests of food aid recipient countries. To this end, a 'safe box' for genuine food aid will be provided to ensure that there is no unintended impediment to dealing with emergency situations. Beyond that, we will ensure elimination of commercial displacement. To this end, we will agree effective disciplines on in-kind food aid, monetization and re-exports so that there can be no loop-hole for continuing export subsidiation. The disciplines on export credits, export credit guarantees or insurance programmes, exporting state trading enterprises and food aid will be completed by 30 April 2006 as part of the modalities, including appropriate provision in favour of least-developed and net food-importing developing countries as provided for in paragraph 4 of the Marrakesh Decision. The date above for the elimination of all forms of export subsidies, together with the agreed progressivity and parallelism, will be confirmed only upon the completion of the modalities. Developing country Members will continue to benefit

41 WTO, *Decision Adopted by General Council 1 August 2004* ('July Framework'), WT/L/579, 2 August 2004. Geneva: WTO, 2004.

from the provisions of Article 9.4 of the Agreement on Agriculture for five years after the end-date for elimination of all forms of export subsidies.[42]

Issues and debate

Following the Hong Kong Ministerial Conference, the chair of the agricultural negotiations, Ambassador Crawford Falconer of New Zealand, has been actively engaging members on the issue of food aid. The deadline of 30 April 2006 was not met, and the negotiations are ongoing. Prior to and at the Hong Kong meeting, the discussions on food aid had to a large extent been dominated by the US and EU. The most controversial issue was that of in-kind versus cash-grant-form food aid. Concerns were expressed in particular about food aid provided by the US under Public Law 480, Title I and Title II. Title I is contentious, as its stated objective is to develop future markets for US exports.[43] Food aid under Title I programmes has, however, declined by more than 90% since 1980.[44] The Title II programme is used to purchase food from US producers that is then sent overseas as food aid. The Title II programme is administered by the US Agency for International Development (USAID); however, the primary purpose of this programme has been described by US politicians as being to help US farmers and stimulate the US economy.[45] It is this characterisation that has led to Title II food aid also being targeted by the EU and other WTO members as particularly trade distorting.

Since Hong Kong, a number of other countries and groups have made written contributions, including the G20, Switzerland and Australia. The paper presented by the African and LDC Groups is discussed below. All these positions have been discussed at length, and the chair has drawn on them in preparing two reference papers on food aid.[46] These documents reflect the thinking of the chair on the key issues in the area of food aid and attempt to find common ground among the different positions put forward by members. Most recently, the chair has proposed a text on food aid as part of a broader formulation of modalities for the agriculture

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42 WTO, *Hong Kong Ministerial Declaration*, WT/MIN(05)/DEC, 22 December 2005. Geneva: WTO, 2005.

43 Young L.M. & P.C. Abbott, *op. cit.*, p. 4.

44 Barrett C. & D.G. Maxwell, *Recasting Food Aid's Role*. Policy brief, 2004, p. 2.

45 *Inside US Trade*, 'Goodlatte criticizes administration's proposed change to food aid', 18 February 2005, p. 1.

46 WTO, 'Chair's reference paper', Food Aid Committee on Agriculture, Special Session, *Export Competition*, 11 April 2006. Geneva: WTO, 2006a; WTO, 'Chair's reference paper, rev 1', Food Aid Committee on Agriculture, Special Session, *Export Competition*, 10 May 2006. Geneva: WTO, 2006b.

negotiations as a whole.[47] The following is a summary of the key issues identified in the chair's reference papers and the WTO debate as a whole.

General provisions

In his first reference paper, the chair of the negotiations noted that the idea of there being general provisions applying to all food aid transactions had been proposed by some members.[48] The openness of members to consider this idea was reiterated in the second reference paper.[49] The aim would be to ensure that any general provisions that are agreed upon do not impede emergency food aid transactions under the 'safe box'. The chair's assessment of the discussions to date appears to favour the development of general provisions for all food aid transactions. He has suggested a number of general provisions along the lines of the following text:

> 2. Members shall ensure that all food aid transactions are provided in conformity with the following provisions:
>
> a. they are needs-driven;
>
> b. they are provided in fully [or, in the event of an exceptional situation, less than fully] grant form;
>
> c. they are not tied directly or indirectly to commercial exports of agricultural products or of other goods and services;
>
> d. they are not linked to the market development objectives of donor Members; and
>
> e. agricultural products provided as food aid shall not be commercially re-exported. Non-commercial re-exportation is permissible, but only where, for logistical reasons and in order to expedite the provision of emergency food aid for another [affected] [country] in an emergency [humanitarian] situation, this occurs as an integral part of a food aid transaction initiated by a relevant United Nations agency, [relevant regional or international intergovernmental agency or organisation, or non-governmental humanitarian organisation or private charitable body].
>
> 3. The provision of food aid shall take fully into account local market conditions of the same or substitute products. Members shall refrain from

47 WTO, *Draft Possible Modalities on Agriculture*, Committee on Agriculture, Special Session, Job(06)/199, 22 June 2006. Geneva: WTO, 2006c.

48 WTO, 2006a, *op. cit.*, p. 3.

49 WTO, 2006b, *op. cit.*, p. 1.

> providing in-kind food aid in situations where this would create, or would risk to create an adverse effect on local or regional production of the same or substitute products. Members are encouraged to procure food aid from local or regional sources to the extent possible, provided that the availability and prices for basic foodstuffs in these markets are not unduly compromised.[50]

Some of the issues raised in the chair's proposed general provisions are discussed in more detail below.

Safe box for emergency food aid

The Hong Kong Ministerial Declaration mandated that a 'safe box' for genuine food aid be provided in the disciplines on food aid. The aim was to ensure that there is 'no unintended impediment to dealing with emergency situations'.[51] Emergency food aid is rarely a trade concern, and the trade disruption is minimal.[52] It is also generally accepted that a large part of emergency food aid often leads to additional consumption by the ultimate beneficiaries.[53] The discussion on the safe box has focused on a number of issues related to the use of the term 'emergency'. These include the definition of an emergency, who can trigger or declare an emergency and the duration of an emergency.

A number of members have suggested that the WTO needs to define what situations will constitute emergencies for the purposes of the safe box. This idea has been resisted by others, who have argued that this is not a question for the WTO, but rather for humanitarian organisations and agencies who are involved directly in responding to such emergencies. The chair of the negotiations has tended to favour the latter position and has argued for the use of a 'multilaterally-oriented trigger as the core test'.[54] Ambassador Falconer has noted that the WTO does not have the knowledge, expertise and standards necessary to determine when an emergency situation exists and that the WTO should not seek to undermine the expertise of other agencies.[55] The proposed text in the modalities paper has a possible option of including the WFP definition of an emergency situation.[56]

Closely related to the question of whether or not a definition of an emergency

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50 WTO, 2006c, *op. cit.*, p. 67.
51 WTO, 2005, *op. cit.*, para. 6.
52 Barrett C. & D. Maxwell, 2005, *op. cit.*, p. 15.
53 FAO, 2005, *op. cit.*, p. 6.
54 WTO, 2006a, *op. cit.*, p. 3.
55 WTO, 2006b, *op. cit.*, p. 3.
56 WTO, 2006c, *op. cit.*, p. 68.

situation is needed is that of who can trigger or declare an emergency. Consensus appears to exist that the UN Consolidated Appeals Process should be at the heart of the trigger mechanism. Still under debate is whether or not NGOs and recipient governments should be involved in the declaration of an emergency. Some members have resisted the call to give a role to NGOs, as suspicion exists about the agenda of such groups in humanitarian operations, their accountability or lack thereof and their relationship with recipient governments, which is often not formalised in any way. Others have pointed out that NGOs usually work in partnership with UN agencies or recipient governments, and that there are few examples where legitimate NGOs have 'got it wrong'.[57] The current text proposed by the chair refers to emergency appeals in various forms:

> 4. (a) a declaration of an emergency by the [affected] [recipient] country [, or, the Secretary-General of the United Nations]; and
> (b) an assessment of need undertaken by [a country] [,] a relevant United Nations agency, including the World Food Programme and the United Nations Consolidated Appeals Process; the International Committee of the Red Cross and the International Federation of the Red Cross and Red Crescent Societies [, a relevant regional or international intergovernmental agency or organisation, an non-governmental humanitarian organisation or private charitable body working in collaboration with the recipient government]; and
> (c) an emergency appeal from [a country] [,] a relevant United Nations agency, including the World Food Programme and the United Nations Consolidated Appeals Process; the International Committee of the Red Cross and the International Federation of the Red Cross and Red Crescent Societies [, a relevant regional or international intergovernmental agency or organisation, an non-governmental humanitarian organisation or private charitable body working in collaboration with the recipient government].[58]

Provision was made in paragraph 5 of the chair's second reference paper for an 'urgent ministerial request' to be used as a trigger in those circumstances where waiting for an appeal would result in undue delay in the provision of food aid.[59] The chair argues that such a provision is necessary in order to implement the Hong Kong Declaration in its fullest form and that it will not provide a loophole, as there will be a notification and review procedure to monitor the use of this

57 WTO, 2006a, *op. cit.*, p. 4.
58 WTO, 2006c, *op. cit.*, p. 68.
59 WTO, 2006b, *op. cit.*, p. 2.

exception. This provision has been modified in the latest draft text and refers to an 'urgent request from the country concerned'.[60]

The third issue related to the safe box is the duration of an emergency situation. Some members have sought to have a time limit placed on the length of time during which food aid can be provided in an emergency situation under the safe box. A number of specific proposals have been received for limitations ranging around three to six months. Such positions have been strongly opposed by those members who argue that it is not the role of the WTO to be defining, triggering or limiting the duration of emergency situations. These members believe that such decisions should be taken by the relevant humanitarian organisations. The chair tends to favour the latter position, while recognising that it is important to ensure that in-kind food aid is provided under the safe box only for as long as is truly necessary.[61] Who will have the ability to assess when there is a continued genuine food need is still to be decided by members, but it is likely to relate to those organisations that have the ability to trigger an emergency situation.

In-kind food aid versus cash-grant form

At the heart of the food aid debate is a philosophical difference among members about the most effective way in which to assist those in need of support – is it through the provision of cash grants for food aid or the donation of food itself? There has been a growing trend towards providing cash support for food aid operations, but the world's major donor of food aid, the US, continues to provide most of its support in kind (99% in 2004). The US food aid programme is viewed by some as a means to dispose of surplus production and as being closely linked to domestic agricultural policies rather than humanitarian or development objectives. Food aid provided in these circumstances is believed to have a greater chance of affecting both local and international markets and therefore resulting in commercial displacement. There has, however, been little empirical research that shows the disincentive effect of food aid on domestic production, but it has long been recognised that cash assistance is most efficient and has fewer potential adverse impacts on both local and international markets than food aid given in kind.[62] The discussions in the WTO are focusing on the best ways by which to discipline the provision of in-kind food aid so as to

60 WTO, 2006c, *op. cit.*, p. 68.
61 WTO, 2006b, *op. cit.*, p. 3.
62 Young L.M. & Abbott P.C., *op. cit.*, p. 4.

ensure that there is a balance between the availability of support and the potential negative impacts on markets.

The chair has recognised the need for a compromise on the issue of cash versus in-kind food aid if the negotiations are to be successfully concluded. The provision of a safe box is one part of this, as it is envisaged that in-kind food aid will be permitted in emergency situations as long as it is mainly in fully grant form. The provision of in-kind food aid in non-emergency situations is more controversial, with some members pushing for it to be phased out and replaced by untied cash-based contributions. Cash grants are not expected to be subject to additional disciplines, whether provided under the safe box or not.

The potential of limiting in-kind food aid raises a major question that is still under consideration by WTO members. Will disciplines on in-kind donations result in members being able to maintain an adequate level of food aid? The US and WFP have indicated that it would not be possible for them to operate at the same level if in-kind food aid was restricted. Some developing countries have also noted that they would not have the fiscal resources available to contribute cash grants, but that they are able to make in-kind donations to food aid appeals. With regard to this latter point, the chair has asked members to consider the possibility of special and differential treatment provisions.[63] The latest text provides for the possibility of a separate phase-out date for in-kind food aid provided by developing country members.[64]

Monetisation

Monetisation of food aid occurs when in-kind donations are sold on the commercial market, and the proceeds are then used to finance related development activities or distribution costs. In most instances, monetisation is undertaken by NGOs or recipient governments. In-kind food aid has been provided as part of the direct budgeted support given to governments by donors. Like the debate on in-kind aid versus cash grants, there are two polarised views on monetisation. The US and others argue that it should be allowed in certain circumstances. Some recipient countries, including those in the African and LDC Groups, acknowledge that monetisation can be useful in funding activities related to the delivery of food aid or the procurement of agricultural inputs. Others, including the EU, would like to see monetisation

63 WTO, 2006b, *op. cit.*, p. 4.
64 WTO, 2006c, *op. cit.*, p. 22.

phased out over the implementation period. It is not yet clear how this issue is likely to be resolved.

Re-export

The chair noted in his first reference paper that there had been no disagreement expressed with the idea that emergency food aid should not be re-exported except in circumstances when the transaction is managed by the relevant international agency.[65] This is reflected in the inclusion of text along these lines in the proposed general provisions for all food aid.

Procurement

At the heart of the proposal put forward by the African and LDC Groups was the concept of ensuring that food aid procurement takes place at the local and regional level as often as possible. There does not appear to be any real opposition to this notion, and it has been included by the chair in his suggested list of general provisions. It is worth noting, however, that there is a possible negative effect of local procurement in that it may result in higher food prices that could crowd out some vulnerable consumers from the market.[66] This is particularly the case in those countries where the market for cereal products is not particularly robust, and where producers have expressed a preference for selling to the WFP if possible.

Tied food aid

Food aid is tied when recipient countries are required to accept either other commercial transactions in parallel to the food aid deliveries or the services used for delivering it are required to be sourced in donor countries.[67] There appears to be a consensus that emergency food aid should not be tied or conditional in any way, as this would defeat the purpose of attempting to deal with the situation in the most effective way possible. Whether this agreement will extend to a general provision for all food aid remains to be seen. It is worth noting that the FAC 1999 also has a provision in article IX(e)(ii) that stipulates that food aid should not be tied. At issue are requirements like that in US legislation that 75% of US food aid must be shipped using US-registered vessels. Canada, Japan and other donors have similar requirements for food aid

65 WTO, 2006a, *op. cit.*, p. 4.
66 FAO, 2005, *op. cit.*, p. 8.
67 *Ibid.*, p.2.

shipments. Barrett and Maxwell show that US funds spent on food aid generate on average less than 50 cents' worth of food production per dollar spent, with the majority of spending going on shipping.[68] Tying of food aid also drives up its cost and delays delivery.[69]

Barrett and Maxwell cite an OECD/DAC report that showed that 90% or more of food aid fits the OECD/DAC definition of tied aid.[70] Agreement on a limitation on tied aid is therefore likely to require amendments to legislation in a number of countries and have a negative impact on the supply of food aid. The US would prefer to see disciplines that do not allow food aid to be tied to the need for recipient countries to make commercial purchases from donor countries.

Notification, consultation, monitoring and transparency procedures

The notification, consultation, monitoring and transparency procedures are some of the most important areas still to be discussed in the context of food aid. Few members have made any concrete proposals in this regard, and the chair's reference papers have not elaborated on these procedures. The latest draft text simply refers to the need for food aid donor members to notify the Committee on Agriculture.[71] At the heart of these issues is the relationship between the WTO and other multilateral organisations that operate in the area of food aid. As was mentioned above, article 10.4 of the Agreement on Agriculture refers to the FAO Principles on Surplus Disposal and the FAC, but does not specify any formal relationship between the bodies responsible for the implementation and oversight of these instruments. Konandreas points out that it is important for the key role of other organisations to be acknowledged by the WTO, as food aid goes beyond legitimate concerns about commercial displacement and involves complex food security issues. He also notes that food agencies can bring specialised knowledge and established operational mechanisms that do not exist in the WTO.[72]

African Group position

At the Hong Kong Ministerial Conference in December 2005, the debate on food aid was largely dominated by the US and EU. The African and LDC

68 Barrett C. & D.G. Maxwell, 2004, *op. cit.*, p. 3.
69 Barrett C. & D.G. Maxwell, 2005, *op. cit.*, p. 8.
70 *Ibid.*
71 WTO, 2006c, *op. cit.*, p. 70.
72 Konandreas P., *op. cit.*, p. 9.

Groups put forward a written position in March.[73] This initiative was warmly welcomed by other WTO members, and the chair used the paper as the basis for his first reference document on food aid.[74] The approach taken by the African and LDC Groups was seen by many to represent the middle ground on the issues under discussion. This was not, however, the case for the EU, who, it is understood, perceived the African and LDC Groups' position as closely aligned to that of the US.

The starting premise of the African and LDC Groups' position was that food insecure countries need food aid, and that any new disciplines on food aid should not hinder the delivery of assistance to needy countries.[75] It was recognised that such assistance should not result in commercial displacement in recipient countries, and disciplines for non-emergency food aid were proposed with this in mind. In summary, these disciplines included that food aid should be:

- demand driven;
- fully in grant form;
- untied;
- procured locally, sub-regionally and regionally where possible;
- aimed at developmental objectives, including through targeted delivery;
- not contingent on advancing market development objectives; and
- not re-exported.

The African and LDC Groups are not opposed to monetisation in exceptional circumstances where the resulting funds are used for activities related to the delivery of food aid or facilitating procurement of agricultural inputs. They do, however, propose limiting monetisation to UN agencies and recipient governmental authorities. NGOs are not mentioned.

With regard to the safe box, the African and LDC Groups do not suggest a definition of emergency situations, but defer to relevant UN agencies. They do not support a specified duration for an emergency and call for independent assessments to be used to determine the food needs involved. Under the African and LDC Groups' proposal, the safe box can be triggered by recipient country authorities and international humanitarian assistance bodies acting in collaboration with the recipient country authorities. It is not clear what is meant by international humanitarian assistance bodies.

A number of African countries (Egypt, Nigeria, South Africa, Tanzania and

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73 African and LDC Groups, *Joint Submission by the African and LDC Groups on Food Aid*, TN/AG/GEN/13, 6 March 2006. Geneva: WTO, 2006.

74 WTO, 2006a, *op. cit.*

75 African and LDC Groups, *op. cit.*, p. 1.

Zimbabwe) are also members of the G20 and are therefore supportive of the position on food aid put forward by the group in a written submission on 19 May 2006.[76] The G20 does not represent many countries that are regular recipients of food aid, but it is in favour of ensuring that the provision of genuine food aid is not jeopardised by WTO disciplines. The G20 supports the view of the chair that the WTO does not possess the necessary expertise and should not tie itself to any particular definition of an emergency or any specific duration limitation. The G20 calls for the focus to be on the declaration of an emergency with the UN Consolidated Appeals Process at the heart of the trigger mechanism. The G20 has expressed some concern about the role of NGOs and charitable bodies.

With regard to the disciplines for non-emergency food aid, the G20 has adopted a position that is similar to the African and LDC Groups. It prefers cash-only donations and would like to see in-kind assistance phased out in non-emergency situations. The G20 would allow monetisation in the same exceptional circumstances as the African and LDC Groups. A useful distinction is drawn between re-export and trans-shipment of food aid by inter-governmental agencies in the G20 proposal. The G20 also encourages developing countries to provide food aid and is in favour of local or regional procurement. In its written submission, the G20 is one of the few groups to elaborate on how it sees the notification and monitoring of food aid operating in the WTO. The Committee on Agriculture is given a central role, and it is noted that notifications need to be more regular, predictable and contain additional information.

Implications for Southern Africa

The implications for Southern Africa of new WTO disciplines on food aid can be looked at in two ways – likely positive and negative impacts. On the positive side, new disciplines are being discussed in a context that is aimed at ensuring that food aid does not disrupt international and local markets and that it does not have a disincentive effect on domestic production in recipient countries. To the extent that these objectives are achieved, the resulting disciplines will have positive implications for Southern Africa, both as a recipient region of food aid and as a region that has a number of food-exporting economies. Food exporters such as South Africa will benefit from the greater liberalisation of world markets as a result of the reduced levels of export subsidisation through food aid.

The requirement for local and regional procurement currently contained in the

76 G20, *Comments on Food Aid*, Committee on Agriculture, Special Session, JOB(06)/150, 19 May 2006. Geneva: WTO, 2006.

draft disciplines will also be of particular value to these countries. South African industry has claimed in the past that 'food aid is killing commercial business' in the region.[77] One way in which to ensure that this is not the case is to improve the disciplines on food aid and to encourage greater levels of local and regional procurement. It is believed by many interviewed for this research that Southern Africa could be self-sufficient with regard to food, but that this potential is not currently being fully achieved. Local and regional procurement would also address concerns raised by De Villiers and Kirsten about the poor quality of in-kind food deliveries made to the Southern African region by donors.[78] There are, however, a number of issues that would need to be overcome in this regard, including tariff and non-tariff barriers, more accurate assessment of grain balance sheets, and logistical difficulties, especially the cost and risk of transportation in the region.[79]

As the WTO disciplines on food aid will be more specific than those currently outlined in the Agreement on Agriculture, there will be positive spin-offs with regard to greater transparency and accountability. WTO rules are binding, and there is a well-established dispute settlement system that will ensure that there is a greater level of commitment from members to adhering to the disciplines on food aid. Recipient countries also have more opportunities in the WTO to influence the direction of the food aid debate than in other multilateral agencies involved in this area, including the CSSD and the FAC. This has been demonstrated by the importance placed on the proposal tabled by the African and LDC Groups. With clear provisions on notification, consultation, monitoring and transparency, the WTO disciplines have the potential to provide an impetus for reform in these other organisations and of the overall architecture governing global food aid.

The negative implications for Southern Africa can be divided into two categories: those that are more general, and those that are specific to the region. At the general level there is the strong possibility that overall levels of available food aid will decrease as a result of the WTO disciplines. The US has already indicated that should it not be possible for it to provide the same amounts of in-kind food aid under the new disciplines, then it will not be in a position to substitute cash grants to the same level. This is borne out by the EU experience, where the move away from in-kind to cash grants resulted in its overall contribution to global food

77 De Villers J., *op. cit.*, p. 1.

78 De Villiers J. & J. Kirsten, 'The role of the South African private sector in meeting food shortages in the sub-region.' *Unpublished paper*, 23 March 2006.

79 *Ibid.*

aid efforts decreasing. In this situation, the limited amount of resources are likely to be channeled to those areas where there are famines and dire emergencies. For example, there are reports that food aid destined for Southern Africa has recently been diverted to respond to the crisis in the Horn of Africa.

Looking specifically at the food aid provided to Southern Africa, the first question is whether or not it will fit within the safe box. Technically, Southern Africa currently receives emergency food aid, but there are different opinions about whether the region is facing an emergency situation. According to the WFP and its definition of an emergency, much of the food aid provided to Southern Africa is for emergency situations. There is a human-made crisis in Zimbabwe, and in many other countries in the region food insecurity can be directly linked to climatic conditions or the HIV/AIDS pandemic. The WFP regional office is concerned to see that the WTO does not adopt a narrow definition of an emergency that would exclude these situations from being covered by the safe box. In the long term, food aid in the region is likely to be directed at those who are chronically food insecure, and therefore issues could arise with regard to any limitations placed on the duration of an emergency as well. The vast majority of food aid in the region is provided in response to appeals by UN agencies or recipient governments. There is some that is channeled via NGOs, but these groups are generally operating in co-operation with the WFP and/or government authorities. The likely trigger mechanism for the safe box should not be a problem for Southern Africa.

If the situation in Southern Africa is not found to be an emergency, then the safe box will not apply to the food aid distributed in the region. This would no doubt have serious implications for the involvement of the US, as well as the WFP and its partner NGOs who receive in-kind food aid. Recipient countries anticipate that this could make it difficult to meet the food needs of those who are chronically food insecure. There would, of course, be the option of receiving in-kind food aid if an emergency is declared in the future due to a drought or conflict, for example.

It is worth noting that most of the food aid contributed by the US to Southern Africa is channeled through the USAID Food for Peace programme. The USDA confirmed that it does not have any large Food for Progress programmes operating in the region and currently only supplies cooking oil to Mozambique and Madagascar. All USAID in-kind donations are governed by the 'Bellmon amendment' requirements. These are legal conditions that must be adhered to when Title II commodities are either distributed or monetised by USAID. The requirements include the availability of adequate storage facilities, that

distribution will not result in a substantial disincentive to or interference with domestic production or marketing in the recipient country, and that the commodities will not have a disruptive impact on the farmers or the local economy of the recipient country.

The direction of the debate in the WTO seems to imply that there will be general provisions applicable to all food aid transactions. These should not cause any difficulties in Southern Africa, as current food aid programmes largely comply with those disciplines that have been suggested. Food aid is needs driven and targeted to the most vulnerable. All food aid is provided in fully grant form. There is no evidence of food aid in Southern Africa being linked to the advancement of market development objectives, but the commodities provided by the US and a number of other donors are likely to be tied. Monetisation rarely occurs, and there is no re-export (on the understanding that this does not include trans-shipment by UN agencies). The WFP has a policy of exploring local and regional procurement options in the region and has made significant purchases under this policy in the past. Outside of Zimbabwe, there is currently very little free food distribution taking place in Southern Africa. Many of the programmes under way to address food insecurity are linked to work initiatives or training schemes on new agricultural techniques. Cash transfers to those who are food insecure are also being trialed in Zambia and Malawi. In short, most of the food aid provided to Southern Africa is well targeted and takes place under what could be described as fairly progressive programmes.

OTHER MULTILATERAL BODIES

While the trade-related aspects of food aid are currently under discussion at the WTO, there are a number of other multilateral bodies that have a specific focus on this issue. The WFP is often the first one that comes to mind, as it is the UN agency tasked with distributing food aid provided by member countries. There are a number of policies put in place by the WFP that are relevant to the consideration of the issue of food aid in Southern Africa. Those related to the current consideration of possible new disciplines on food aid are discussed below in a brief section that by no means does full justice to the work of the WFP. The other multilateral bodies also considered in this paper are much less well known than the WFP and present unique issues with regard to their role in the food aid debate. The first is the FAO CSSD and the second is the FAC of the International Grains Council.

World Food Programme

The WFP was established in 1962 under the joint auspices of the UN and FAO. It was at first put in place for a three-year experimental period, but has continued ever since and become the multilateral agency that is at the heart of food aid operations around the world. In 1994 the WFP adopted a mission statement that outlines how it will provide food aid in emergency situations and to support economic and social development. The WFP is governed by a 36-member Executive Board and has an executive director (currently James Morris) appointed by the secretary-general of the UN and the director-general of the FAO. The members of the Executive Board are half elected by the Economic and Social Council of the UN and by the FAO Council. Current members from Africa include Algeria, Angola, DRC, Ethiopia, Niger, Senegal, Tanzania, Tunisia and Zimbabwe. Like many other multilateral bodies, the candidates for the WFP Executive Board from Africa are decided at a regional level (under the AU) and often on a rotational basis. The broad membership base of the WFP Executive Board makes it one of the most broadly representative agencies involved in the area of food aid.

There is no doubt that the WFP has acquired expertise in the provision of food aid, especially in emergency situations. It is continuously attempting to improve its operational systems and procedures to ensure that the food aid it provides is targeted appropriately and reaches the most vulnerable people. In some areas, the WFP is moving more towards food aid that supports broader development objectives rather than simply emergency relief. This is currently the case in Southern Africa, where most countries are no longer faced with large numbers of at-risk people due to drought, floods or conflict. It is also worth noting that the WFP works closely with recipient governments in the provision of food aid. The relationships between the WFP and the governments of Southern Africa appear to be strong – with the exception of Zimbabwe. Officials interviewed for this report expressed their satisfaction with the level of co-operation and consultation with the WFP.

More controversial has been the position taken by the WFP Secretariat in relation to the negotiation of new WTO disciplines on food aid. The WFP gave a number of press briefings and took out full-page advertisements in international newspapers during the Hong Kong Ministerial Conference. The opinion expressed by WFP was firmly in favour of retaining the ability to receive in-kind contributions and was therefore criticised by many as a partisan approach in favour of the US policy. The result was a strong censure of the WFP Executive Director and Secretariat by some members of the Executive Board, especially

those from the EU. The WFP claims that it has been misunderstood and that it was in no way trying to use scare tactics in order to influence the outcome of the WTO negotiations, nor simply defending its own existence and resource flow. The position of the WFP, as explained during interviews conducted for this research, is a more balanced one. As outlined by the Zambia country director, the WFP requires access to both cash grants and in-kind donations in order to undertake its work effectively. This is also reflected in a recent WFP Executive Board document that indicates that the WFP will take donations in cash or in kind, but notes that cash generally provides more flexibility.[80] In addition, the WFP claims to be fully aware of the potential impact on markets and trade of its activities and has appropriate policies in place to address these problems.

FAO Consultative Subcommittee on Surplus Disposal

The FAO CSSD was established in 1954 as a subsidiary of the Committee on Commodity Problems. One of the first acts of the CSSD was the adoption of the FAO Principles of Surplus Disposal. These are a non-binding commitment and constitute 'a code of international conduct which encourages the constructive use of surplus agricultural commodities and at the same time safeguards the interest of commercial exporters and local producers'.[81] The Principles were later supplemented by new consultative and reporting procedures that provide for greater transparency in the notification of food aid transactions that are likely to cause harmful interference with normal patterns of production and trade. UMRs were adopted in order to provide some means to assess the impact of such transactions. These decisions are specifically referred to in article 10.4 of the WTO Agreement on Agriculture, together with the FAC.

The CSSD has the potential to play a leading role in the area of food aid, but is a problematic body in a number of ways. Firstly, the title still reflects the notion of 'surplus disposal', even though the role of the CSSD is no longer concentrated on consideration of this activity. The inclusion of the words 'surplus disposal' implies a focus on a practice that has long been viewed with disdain by many developing countries and which is clearly seen as trade distorting. Secondly, the Secretariat of the CSSD is based in Washington, DC rather than in Rome with most of the FAO administration. This direct linkage to the US again adds to the perception that the CSSD is a body that represents the interests of large

80 WFP, *Funding for Effectiveness*, WFP/EB.2/2005/5-B, 7 October 2005. Rome: WFP, 2005c, p. 3.

81 FAO, *Reporting Procedures and Consultative Obligations under the FAO Principles on Surplus Disposal: A Guide to Members of the FAO Consultative Subcommittee on Surplus Disposal*. Rome: FAO, 2001, p. iii.

agricultural producers rather than recipient countries. Thirdly, the membership of the CSSD is open to all members of the FAO, and there are currently 41 members. The CSSD is, however, dominated by a few donor countries, but even then Barrett and Maxwell note that these countries routinely ignore the CSSD when it suits them.[82] Few African or least-developed countries are on record as having actively participated in CSSD meetings, despite claims by World Vision that a reason for keeping the CSSD located in Washington is that there is greater representation of LDCs there.[83]

There is still likely to be a role for the CSSD under the new WTO disciplines, and this would therefore seem to be an opportune time to look at possible reform of this institution. Konandreas makes a number of constructive suggestions about possible changes to the Principles of Surplus Disposal and the operational procedures of the CSSD.[84] These include:

- revising the register of transactions to bring it into line with new WTO disciplines;
- making full use of the FAO Global Information and Early Warning System, as well as WFP assessments to ensure that food aid transactions respond to the needs of the recipient country;
- replacing the concept of UMR system with a more appropriate measure, which Konandreas calls the commercial import requirement (CIR);
- establishing a formal link between the CSSD and the WTO Committee on Agriculture;
- imposing a legal obligation on donors to report food aid transactions to the CSSD;
- renaming the CSSD and the Principles so as to avoid the term 'surplus disposal'; and
- relocating the CSSD to Rome.

These suggestions are all positive, and some could also assist in encouraging greater participation by recipient countries in the CSSD. The suggested change from UMR to CIR is particularly important in this regard. The UMR system is a commitment by the recipient country of food aid to maintain a normal level of

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82 Barrett C. & D. Maxwell, 2005, *op. cit.*, p. 3.

83 World Vision, *Testimony by Mark Viso*, Vice President of Operations, International Programs Group, World Vision, 21 September 2005, before the United States Senate Committee on Agriculture, Nutrition and Forestry, Regarding the Status of the World Trade Organization Doha Round Negotiations on Agriculture, 2005, available at http://www.worldvision.org/worldvision/wvususfo.nsf/stable/globalissues_criticalissues_dohaAg, accessed 6 June 2006.

84 Konandreas P., *op. cit.*

commercial imports of the same commodity and is based on a rolling average of the last five years of commercial imports.[85] The aim of the UMR system is to ensure that food aid results in additional consumption and that there is no adverse impact on commercial trade.[86] Konandreas notes that additional consumption is difficult to achieve in the majority of food aid interventions, and therefore the UMR tends to only safeguard the commercial interests of exporting countries and not necessarily the interests of domestic producers in the recipient country.[87] Recognising this problem, the UMR system can be negotiated at a bilateral level to take into account additional factors. Recipient countries are likely to benefit from this process being multilateralised. The concept of CIR proposed by Konandreas would do this by looking at the *capacity* of recipient countries to import commercially. The result would be a greater level of assurance provided to recipient countries that food aid would not be provided at levels that cannot be absorbed by the local market.

Food Aid Convention

The FAC is one of two treaties – the other being the Wheat Trade Convention – that constitute the International Grains Agreement 1967. The primary aim of the FAC is to ensure that there is a predictable flow of food aid every year. It came in to being at a time when there was a decrease in the global availability of food and fewer large surpluses.[88] The minimum guaranteed volume of food aid under the FAC is renegotiated periodically. It peaked in the 1980s at around 7.6 million tonnes of cereal, but was lowered in 1995 and 1999 to around 5.5 million tonnes in wheat equivalent. Individual donors' shares of the minimum guaranteed volume are negotiated separately. There is, however, no provision in the FAC to ensure that these commitments are fulfilled, as it does not have a binding enforcement mechanism. FAC members are required to notify food aid contributions, but only up to their agreed 'minimum commitments'.[89]

In addition to the guaranteed minimum level of food aid, the FAC included guidelines on the provision of food aid. They were designed to ensure that food aid is targeted effectively and that it is directed towards the neediest countries.[90] The FAO Principles of Surplus Disposal are referenced in the FAC, but once

85 *Ibid.*, p. 12.
86 FAO, 2005, *op. cit.*
87 Konandreas P., *op. cit.*, pp. 12–13.
88 *Ibid.*, p. 4.
89 FAO, 2005, *op. cit.*, p. 8.
90 Konandreas P., *op. cit.*, p. 4.

again there is no established formal linkage between the two bodies. The FAC, including the guaranteed minimum level of food aid, is due to be renegotiated once the WTO has agreed on new disciplines.

Like the CSSD, there are problems of location and membership with the FAC. The FAC Secretariat is located in London, which again makes it more difficult to co-ordinate with other food agencies, such as the FAO, WFP and CSSD. The membership of the FAC is even more limited than that of the CSSD, and is entirely dominated by donor countries – the EC, some EU members, plus an additional seven donor countries. Recipient countries do not participate in the FAC,[91] but a number of African countries, including South Africa, Morocco and Kenya, have attended as observers of the FAC. This was reported as an often-fruitless exercise by South African industry representatives and officials. The real negotiations and discussions at the FAC take place in informal sessions where observers are not welcome. Generally, there was little opportunity for observers to participate. The South African government is considering joining the FAC, given that it has in recent years become a donor of food aid. This would enable it not only to pursue its own interests, but also to maintain an informal watching brief on FAC deliberations on behalf of the SADC region.

The need to expand participation in the FAC and to improve its responsiveness to the views of recipient countries has been recognised by a number of donor countries. For example, the Swiss have expressed in the WTO negotiations their lack of satisfaction with the operation of the FAC. US officials interviewed as part of this research also noted that it was time to consider reform of the FAC. It is hoped that the new executive director, Etsuo Kitahara of Japan, will be more proactive in making the FAC relevant to the evolving debate on food aid.

One reform proposal that has caught the imagination of a number of commentators is the idea of a Global Food Aid Compact (GFAC). The idea was first suggested at a high-level international workshop on food aid hosted by Germany in September 2003 and is endorsed in the resulting Berlin Statement on Food Aid for Sustainable Food Security.[92] Barrett and Maxwell have expanded the idea and provided detailed recommendations on what the GFAC could look like.[93] Of particular appeal for the Southern African region is the idea that it would be fully inclusive of recipient countries as well as donors. The aim would be to improve coherence of bilateral and multilateral food aid programmes by

91 Barrett C. & D. Maxwell, 2005, *op. cit.*, p. 7.

92 Von Braun J., 'Berlin statement on food aid for sustainable food security.' Declaration at the International Workshop on Food Aid – Contributions and Risks to Sustainable Food Security, 2–4 September 2003, Berlin, Germany.

93 Barrett C. & D. Maxwell, 2005, *op. cit.*

also including the operational agencies that distribute food aid as participants.[94] It is proposed that the GFAC be linked directly to the new WTO disciplines in order to provide an effective enforcement mechanism. All parties would sign up to a GFAC code of conduct that would provide a universal set of principles governing the allocation, utilisation and monitoring of food aid.[95]

GENETICALLY MODIFIED FOOD

GM food became an issue in relation to food aid in the region during the crisis situation in 2002/03. It was at that time that questions were first raised by recipient governments about the safety of the food distributed as food aid. This was particularly with reference to the food aid from the US, where much of the maize is grown from GM seeds. White maize, which is the most popular grain in Southern Africa, from the US is not usually a GM food, but it is not possible to certify that it is GM free due to issues related to possible mixing of white and yellow maize. At the time of the Southern African food crisis, the WFP and NGOs were receiving in-kind donations of maize from the US.

In 2002/03 Lesotho, Malawi, Mozambique, Swaziland, Zambia and Zimbabwe all adopted a firm position on the question of GM food aid. Malawi and Zimbabwe requested that all GM maize imported from the US be milled (either outside the country or immediately upon arrival) prior to distribution in order to ensure that it was not inadvertently used as seed. The concern was that the seeds of the maize could spread GM strains and contaminate indigenous crops. Mozambique preferred the maize to be milled and also requested that it be securely packaged to avoid spillage in transit.[96] Lesotho and Swaziland allowed non-milled GM maize from the US to be distributed as aid, but government warnings were issued in both countries against the use of the grain for cultivation.[97] It was made clear that any food aid received should be for consumption only.

Zambia went further than its neighbours and imposed a ban on all GM food aid in August 2002. The Zambian government believed that GMOs presented serious human health, environmental and agricultural issues that were difficult to resolve.[98] At the time, this was a controversial decision, as the food aid from the

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94 *Ibid.*, p. 10.

95 *Ibid.*, p. 20.

96 Clover J., *Situation Report: Genetically Modified Foods in the African Context: Behind the Smokescreen of the Current Debate*. Pretoria: Institute for Security Studies, 2002.

97 Mayet M., *Africa: The New Frontier for the GE Industry*, 2004, available at http://www.gmwatch.org/archive2.asp?arcid=4023, accessed 5 June 2006.

98 Hanyona S., *Hungry Africa Strives to Harmonize GMO Policies*, 2003, available at http://www.ens-newswire.com/ens/oct2003/2003-10-10-01.asp, accessed 5 June 2006.

US was already in Zambia in WFP stores and had been scheduled for distribution during a particularly critical time in the emergency period. The WFP was required to move the maize and source alternative food for its programme in Zambia. This was an expensive and lengthy process. The Zambian government came in for some emotive criticism from those claiming it was willing to sacrifice the lives of people because of a policy that was not backed by scientific evidence.

There has been much speculation about the decision taken by Zambia to ban GM food aid. At the time, both the US and EU were involved in the debate. The EU was said to have put pressure on the Zambian government by saying that its export trade to Europe would be affected if GMOs were to be planted in Zambia. One UN official interviewed as part of this research speculated that the Zambian policy was in part driven by an anti-colonialism sentiment, and that the Zambian government saw an opportunity to take a stand against US influence in the region. There is no doubt that the question of GMOs became a political issue in Zambia. This was in part fuelled by the local press, who seized on the issue and ran with it for a number of years. One well-placed official in Zambia argued that the ban was put in place due to a strongly held belief by the president himself against the safety of GMOs. This theory would fit with those who have observed that the anti-GM lobby was able to gain high-level access in Zambia and to exert considerable influence on politicians and officials.

The complex nature of the GMOs debate is emphasised by Zarrilli, who explains some of the factors that influence a country's position on biotechnology and lists policy awareness, the level of risk it is willing to accept, the capacity to carry out risk assessments, perceptions of the benefits of biotechnology, dependence on agricultural exports, reliance on food aid and investments made in the biotechnology sector.[99] A number of these points obviously played a part in the development of the Zambian policy, but, whatever the motivations behind the original decision, Zambia has stuck by its position against GM food and has implemented a comprehensive biosafety and biotechnology policy. Even as recently as February 2006, the Zambian agriculture minister, Mundia Sikatana, confirmed that Zambia does not want GM foods.[100]

Efforts are continuing on the development of a regional policy on GM food in Southern Africa. The SADC Advisory Committee on Biotechnology and Biosafety was created and tasked by heads of state in 2002 to develop guidelines to help member states guard against potential risks in food safety, contamination of

99 Zarrilli S., *International Trade in GMOs: Legal Frameworks and Developing Country Concerns*, UNCTAD/DITC/TNCD/2004/1, 8 November 2004. Geneva: UNCTAD, 2004.

100 *The Star*, 'Africa vows to resist after GM ruling', Business Report, 9 February 2006.

genetic resources, ethical issues, trade-related issues and consumer concerns.[101] In August 2003 the Advisory Committee approved a series of interim measures aimed at guiding the region on issues related to biotechnology and biosafety. The recommendations of the Advisory Committee were approved as SADC guidelines in May 2004. These guidelines deal with handling food aid, the development of policy and regulations, capacity building, and public awareness and participation.[102] On food aid, it is recommended that all consignments containing GM grain should be milled or sterilised prior to distribution. Preference was given to food sourced in the region. Recommendations were also made that included the development of a harmonised transit information and management system for GM food aid, and the requirement that GM food aid in transit be clearly identified and labelled in accordance with national legislation.[103]

Beyond the SADC guidelines on GM food aid, it has not been possible for countries in the region to harmonise their biotechnology policies and legislation. South Africa is the only country in the SADC region that grows GM crops at a commercial level. In 2003 it accounted for 1% of the global total transgenic crop area and was the sixth-largest grower of GM crops after the US, Argentina, Canada, Brazil and China.[104] In 2002 it was estimated that about 6% of the total of white maize grown is from GM sources. This amount is growing as more farmers plant GM seeds. South Africa therefore has a very different approach on the question of GMOs than Zambia and other countries in the region. This may cloud issues related to food aid in the future, especially with regard to regional procurement and the role of trade in addressing food security problems. To date, it has been possible to overcome concerns through testing and certification of South African commodities. This may, however, become more difficult as the amount of GM crops planted in South Africa continues to increase.

CASE STUDIES

Zambia

Zambia is a land-locked country of 11.7 million people. It is classified as an LDC, with an estimated annual per capita GDP of $900 in 2005. Zambia is one of the

101 SADC Heads of State and Government Summit, 'Communiqué', Luanda, Angola, October 2002, available at http://www.issafrica.org/AF/RegOrg/unity_to_union/pdfs/sadc/communiques/HoS%2002.pdf, accessed 5 June 2006.

102 Zarilli S., *op. cit.*, p. 9.

103 Greenpeace, *Trailing behind the Pack*, available at http://www.greenpeace.ca/e/campaign/gmo/documents/Trailing.pdf, accessed 5 June 2006.

104 Zarilli S., *op. cit.*, p. 3.

world's poorest countries and it faces many challenges, including the HIV/AIDS pandemic. The agricultural sector in Zambia contributes 21.7% to GDP and employs 85% of the population. Agricultural production varies across the country, with some of the most fertile regions being in the south and east of the country. Production levels also vary greatly from year to year, depending on the weather conditions. Zambia is vulnerable to natural disasters, including floods, drought and animal disease. Approximately 70% of Zambia's farming is done on a small scale, with commercial farms concentrating on commodities such as cotton and tobacco rather than food crops. Food in Zambia is provided through local production, trade and, at times, food aid. Food aid usually only accounts for less than 10% of production of cereals.

Zambia was one of the countries hardest hit by the food crisis in Southern Africa in 2002/03. Drought conditions in the production season for 2004/05 again resulted in low levels of production (28% down on the previous year). In 2005 food aid was distributed to 1.2 million people who were assessed to be the most vulnerable. A large part of this was distributed by the WFP, which provided food to 1.1 million people, as well as 75,000 refugees from Angola and the DRC who live in camps in Zambia.[105] WFP activities in Zambia include school feeding, food for work and health clinic food distributions with the aim of targeting the most vulnerable. The C-SAFE consortium of NGOs also has a feeding programme in Zambia and is the other main provider of food aid. The government provides some food parcels as well. There have been bilateral donations of food aid in the past comprising rice from India and Algeria (channelled through the WFP), but these have not been significant amounts. Cash donations are reported to have been received from China and Egypt in the past. They were apparently used to provide budgetary support for the Food Reserve Agency (FRA). Monetisation of maize does not take place in Zambia.

Production levels of maize were well up in 2006, with a 63% increase above the previous season to a total of 1,424,439 metric tonnes. A surplus of 160,000 metric tonnes was expected, but after this estimation there was an increase in the strategic purchases made by the FRA from 80,000 to 200,000 metric tonnes. FEWSNET Zambia did not expect that there would be any general food aid distributions in 2006. Some targeted programmes aimed at assisting the most vulnerable, such as school feeding schemes, are continuing. The vulnerability assessment for 2006 showed that food access and food availability had improved

105 WFP, *Food Security Overview: Zambia*, 2006a, last updated 1 February 2006a, available at http://www.wfp.org/country_brief/indexcountry.asp?region=3&section=9&sub_section=3, accessed 10 May 2006, p. 1.

in Zambia – thanks largely to a good harvest and the relatively low price of maize. The FAC did find that dietary diversity remains inadequate among some rural households, despite the availability of a range of foods.[106]

The co-ordination of food aid entering Zambia is the responsibility of the Disaster Management and Mitigation Unit (DMMU) under the Vice President's Office. It has a strong focus on planning and preparedness for emergency situations and looks at food aid needs from an immediate perspective, as well as a medium- to long-term one. All food aid donations made to Zambia must be reported to the DMMU. It operates a Consultative Forum made up of NGOs, donors and private sector representatives, and oversees the vulnerability assessment process. One of the core functions of the DMMU is monitoring the implementation of food aid appeals. The aim is to ensure that food aid is targeted correctly and does not have a negative impact on the local market. The DMMU is conscious of the need to guard against additional amounts of food aid entering Zambia and mindful of the possibility of creating dependency among the population.

Zambia presents some unique problems with regard to food security. The country is prone to extreme weather conditions, but droughts or floods do not often affect the whole country at the same time. Part of the challenge is therefore to move food from surplus areas to deficit ones. The DMMU sees a role here both for the private sector and the WFP. The use of local transport companies by the WFP was pointed out as a positive spin-off in this regard. The Zambian transport industry, however, noted that the WFP often paid over market rates for trucks and therefore pushed up the price of transport for the commercial sector.

The WFP has procured maize locally in Zambia for both redistribution in-country and for programmes in neighbouring countries. Since 2003 the WFP has purchased 220,000 metric tonnes locally. This is seen as a positive development by many, and the WFP was keen to pursue further local purchases in 2006, given that there was a surplus expected. This practice does, however, need to be carefully managed. Large tenders, such as those undertaken by the WFP, have the potential to create distortions in a small market such as Zambia. Industry representatives noted that there was a perception among some farmers that it was better to sell to the WFP than to other buyers.

If word got out that the WFP was looking to buy, then farmers have been reported to hold back their stock in anticipation of a tender. Such procurement was not seen to be of much benefit to the smaller private sector companies either

106 FEWS NET Zambia, *Zambia: Food Security Update July 2006*. Lusaka, Zambia: FEWS NET Zambia, 2006b, p. 1.

(even though the WFP has now reduced its tender size), and the informal sector is believed to bear the biggest burden of the market impacts of such policies. Zambian industry representatives noted that bulk buying, by the WFP, FRA or others, could also drive up the price of maize and disadvantage consumers. The WFP country director in Zambia seemed well aware of the need not to distort prices when purchasing locally, and tenders are timed specifically to ensure that prices are kept stable.

As discussed above, the Government of Zambia has imposed a ban on all GM food. At the time, this decision caused some difficulties for the WFP and other food aid providers, largely because there were already stocks of food aid from the US in Zambia ready for distribution. These had to be removed from the country and alternative sources of food found. The GM policy is no longer seen as a problem, however. The position of the government is clear and the WFP, US and others have simply adapted their programmes. The US provides sorghum and bulgur wheat instead of maize. The maize distributed by the WFP is certified as GM free. The government has put in place a testing system and laboratory (with the help of US funding). In order to allow imports of South African maize in 2005, technicians and officials visited South Africa to undertake a series of tests and assessments of the certification procedures used by South Africa.

Zambia has taken a number of steps towards liberalising its trade regime in recent years. Maize, however, continues to be a politically sensitive commodity, and the government has continued to interfere in the market in a number of different ways. The FRA is a parastatal tasked with retaining strategic grain reserves. It buys maize from farmers at an indicative minimum price that is often higher than the market price. This provides an indirect subsidy to the farmers and is used to help keep prices stable, as well as encourage the planting of more crops in the following season. It was observed that the FRA had a particularly large impact on more remote areas where there were few other buyers. The behaviour of the FRA is also not seen as particularly consistent, and instability in the market results from a lack of predictability about the purchase and release of stock by the FRA.

The government also imposes export bans on maize in times of a deficit in production, thus creating a one-way maize trade system. This is one of the reasons that commercial farmers have moved away from planting maize, as the possibility of an export ban creates instability and a disincentive. An export ban was in place for most of 2006, but the FRA was given permission to export up to 100,000 metric tonnes of maize. The imposition of a 15% duty on maize is seen as an effective import ban and another way in which the government has

interfered in the maize market. The duty caused considerable concern in 2005 when there was little maize available locally. Import permits are another way of controlling the trade of maize in Zambia. Permits were finally granted to some private sector companies and approximately 70,000 metric tonnes was delivered from South Africa. The point was again made that neither of these instruments is used by the government consistently and transparently.

The grain millers in Zambia also claim that the government influences the market for finished products or mealie meal through a number of different mechanisms. It has been known to subsidise individual millers in order to keep the price of mealie meal low. Most recently it has put a law before parliament that will require all mealie meal to be fortified. Initially this will apply to commercial millers operating in Zambia (with about 60% of the market) and imports. Food aid that is donated in kind will also need to be fortified before it can be distributed. The fortification package developed for Zambia by the Global Alliance Against Malnutrition and the government is different from that used in South Africa, Kenya and other countries in the region. The main difference appears to be in the level of iron that is included. This legislation is expected to be passed in the next few months and will come into effect shortly thereafter. Zambia already has a policy in place that requires sugar to be fortified with vitamin A.

Lesotho

Lesotho is a small, land-locked country and is classified as an LDC. It has a population of just over two million people and had an estimated annual per capita GDP of $2,500 in 2005. It has a small agriculture sector, with some farmers producing cereals and other foods. Agriculture is, however, the primary source of employment, with 86% of the resident population engaged in subsistence agriculture. Agriculture contributes 15.4% to GDP.

Lesotho remains largely dependent on commercial imports for the provision of food. In 2004 it was estimated that local cereal production contributed 30% of national cereal requirements.[107] For most people, purchased food is a significant source of annual kilocalories.[108] Lesotho has been a recipient of food aid for a number of years. This has largely been due to extreme weather conditions, but recent studies have shown that chronic and persistent vulnerability to hunger

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107 WFP, *World Hunger: Lesotho Food Security Overview*, 2006b, last updated February 2006, available at http://www.wfp.org/country_brief/indexcountry.asp?region=3&section=9&sub_section=3, accessed 10 May 2006, p. 2.

108 Lesotho, *op. cit.*, p. 9.

and poverty exists in certain areas in Lesotho.[109] Food aid does, however, account for a relatively low proportion of total cereal supply.[110] Between 1992 and 2002 food aid was an average of 3.3% of total supplies. During this period, however, there were large fluctuations in the level of production and imports. An overall supply deficit has emerged in Lesotho, and food security for many people is dependent on their ability to purchase food.

The WFP set up a programme in Lesotho during the Southern African crisis in 2002/03. It has continued to provide food aid support since then, but has moved away from the free distribution of food to more development-oriented programmes such as food for work. In the first quarter of 2006 the WFP planned to feed about 245,000 people in Lesotho.[111] C-SAFE started its Lesotho programme in 2004 and provides food in return for participation in training on new farming and gardening methods. In its first year (2004/05), C-SAFE targeted 16,000 participants in six districts in Lesotho. There are numerous other small players also involved in food aid in Lesotho. These include local and international NGOs, as well as churches. Most of these organisations receive food in kind. None of the donations is currently monetised, although this was done in the past by World Vision. The WFP has a policy of purchasing some local produce and also uses local milling facilities whenever possible.

Like many other countries, food is highly political in Lesotho. It was clear from the current research that there are differing agendas with regard to food aid within the government and among the key players. There have been mixed messages from the Government of Lesotho with regard to its food aid needs. Reportedly, for example, the prime minister asked for the support of the WFP during the last UN General Assembly. Shortly thereafter the minister of agriculture lashed out at the WFP and others for distorting the food market in Lesotho. Government officials seem to widely believe that a culture of dependency has been created in Lesotho, and that there is now a real problem, especially with regard to encouraging greater levels of agriculture production. A lot of the fertile land in Lesotho is currently lying fallow. Some argue that this is because people do not have an incentive to farm, as they are receiving food handouts or being required to work elsewhere in order to get food. Others say that it is more likely a result of poor farming techniques and soil erosion, as well as the HIV/AIDS pandemic, and that many of the current food aid programmes

109 Disaster Management Authority (DMA) & WFP, *Uncovering Chronic, Persistent Vulnerability to Hunger in the Southern Lowlands and Senqu River Valley: Report of the DMA–WFP Targeting Exercise*. Maseru: DMA & WFP.

110 Lesotho, *op. cit.*, p. 11.

111 WFP, 2006b, *op. cit.*, p. 1.

in Lesotho encourage people to explore new ways of using their land through methods such as conservation farming.

A Food Security Policy has recently been prepared for Lesotho. It was endorsed by the cabinet in April 2005 and has since been translated into a National Food Security Plan of Action. There are five programmes under the plan of action, and one of these is focused on food aid. The suggestion has been made that a food aid policy should be developed as part of this programme. A food aid policy does in fact exist in draft form and was prepared in 2000.[112] The draft is fairly general in its approach, but sets out sound theoretical arguments on a range of issues related to the provision of food aid. It does not seem to have been adopted, however, and it is unclear exactly why not. The result is that there are mixed feelings about the value of a new food aid policy. Most of those involved in the food aid area noted that it would be worthwhile to improve co-ordination of efforts and to have a clear policy line enunciated by the government. Others feared that the development of a food aid policy would just become another bureaucratic exercise that could result in little real change on the ground. The WFP is preparing its own contribution to the discussion of a possible food aid policy.

There are definitely some areas in which improvements could be made with regard to food aid in Lesotho. Whether these require a new food aid policy is not clear. It may be possible to address them through existing mechanisms such as the Food Security Working Group rather than spend time and resources on the drafting of another document. Some of the points it would be worth addressing include:

- clarity on where responsibility for food aid lies within existing government structures;
- greater definition of the role of the responsible government unit in the Disaster Management Authority;
- greater co-ordination among food aid donors;
- clarity on the government position on food aid, including the issue of food in kind versus cash grants;
- improved monitoring of the inflows of food into Lesotho, including through the informal sector; and
- agreement on the extent of the problem with regard to food insecurity.

In the context of the WTO, Lesotho has been actively following the discussions on food aid. It participated in the preparation of the African and LDC Groups' paper. The main aim for Lesotho is to ensure that there is a stronger voice for recipient countries of food aid. It hopes that through a multilateral process

112 Sejanamane M.P., *Final Draft Report on Lesotho Food Aid Policy*. Maseru: Marabeng, 2000.

it will be possible to have a greater influence over the actions of donors. The Government of Lesotho strongly believes that food aid does cause a level of commercial displacement and therefore stronger disciplines are needed. WTO rules are considered ideal, as they are binding and more enforceable than those made by other international organisations. It was noted that the formulation of a food aid policy for Lesotho could be useful in determining the approach to be taken in WTO negotiations.

It is not yet clear what the impact of new WTO disciplines on food aid would be on Lesotho. Lesotho could suffer from the likely decline in resources available for food aid should in-kind grants be ruled out in many circumstances. Much of the food aid that Lesotho currently receives is indirectly from the US, either through the WFP or C-SAFE. The *Diagnostic Report* that preceded the Food Security Policy does suggest cash transfer schemes may be a more preferable means to assist those who are vulnerable to food insecurity than direct food aid deliveries.[113] Whether this suggestion is pursued further remains to be seen.

Lesotho does not have a specific approach with regard to the receiving of GM food aid. Much of the food aid that is donated comes from the US, and the vast majority of the food available commercially is from South Africa. Both these countries grow GM maize. While there is no specific policy prohibiting the sale and distribution of GM food, some concerns have been expressed about the lack of scientific information available on the safety of GMOs. This has resulted in one WFP shipment of sorghum from the US being delayed, as a request was made for it to be milled before distribution. This was not possible, but the sorghum was distributed regardless. At a practical level, it would make little sense for Lesotho to adopt a restrictive policy on GM food, given that it is surrounded by South Africa, has porous borders and would struggle to enforce any restrictions.

CONCLUSION

Southern Africa faces a number of ongoing challenges related to food insecurity. There are climatic conditions that regularly impact on the production levels of the region, the HIV/AIDS pandemic has increased the vulnerability of many households and political considerations have also had a negative impact on the availability of food in some cases. There is therefore no doubt that the debate on food aid is of importance for the Southern African region. The region is unique in that it includes both a donor and recipients of food aid. South Africa is in a

113 Food Security Policy Team, *Food Nutrition Insecurity in Lesotho: Problems, Trends and Responses: Diagnostic Report Second Draft*. Maseru: Department for International Development, 2004.

strong position to continue to provide food for its local market and that of the region. Other countries are net food-importing countries and will remain reliant on imports to meet their food requirements for at least the foreseeable future.

There are more mixed views on what the role of food aid will be in Southern Africa in the long term. It does seem likely, however, that food aid will be needed to address specific pockets of chronic food insecurity in a number of countries and to respond to emergency situations should they arise as a result of drought, floods or conflict. Donors have plans to continue to assist in the region through the provision of food aid under multilateral and NGO programmes. Currently, just under half of the food aid distributed in the Southern African region is provided in kind. The rest is received as cash grants and is usually channelled through the WFP or C-SAFE or other NGO pipelines.

The question that has been asked in this research is what the impact on the flow of food aid to Southern Africa would be of new WTO disciplines on food aid. The general conclusion reached is that the majority of food aid received in the region would fit within the new disciplines. In large part, the food aid provided is needs driven and well targeted. It is provided in fully grant form and very little is monetised or re-exported. Local and regional purchases are made by the WFP and other food agencies. Donors do not appear to be pursuing market development objectives through the use of food aid in Southern Africa. There are a number of progressive programmes in place that are moving away from the distribution of free food. For example, in Lesotho food aid is provided to those who attend training on new methods of farming, and in Zambia work is under way to test the possibility of providing cash transfers as a means of addressing food insecurity. Any impact on the availability of food aid for Southern Africa is therefore likely to be as a result of reduced levels available in the global context due to restrictions placed on the use of in-kind and tied grants. In the past, there have been instances reported where food has been diverted from Southern Africa to other emergency situations. If global supplies are further limited, then this could become a more common occurrence.

In light of these possible threats to the availability of food aid in the region, it is recommended that governments continue to participate actively in the discussions in the WTO and also consider becoming more involved in other multilateral bodies, such as the WFP Executive Board, the FAO CSSD and the FAC. The CSSD and FAC are in need of urgent reform so as to be more effective players in the area of food aid. This has been recognised by donors, and it is therefore an opportune time for recipient countries to become more involved and to seek a greater voice in the discussions. This could be reinforced through the

notification, consultation, monitoring and transparency procedures of the new WTO disciplines on food aid. The proposed GFAC is also worth considering.

Ongoing discussion at the regional level of SADC is important. SADC could usefully consider the development of more advanced information systems that would help in assessing the regional needs for food aid. Efforts are already under way, but these should be stepped up with a focus on achieving greater self-sustainability within the region. The role of the private sector in addressing food security in the region could also be considered. This would require careful consideration of existing barriers to trade among countries and distribution problems. In the long term, greater involvement of the private sector could reduce the dependency of the region on food aid from donors.

Regional co-ordination efforts could also usefully look further at the question of GM food. The SADC guidelines have provided some general advice on dealing with GM food aid, but they have not resulted in a harmonised approach on the issue by governments in the region. Different requirements have been enacted by SADC members, and considerable resources are being used in the development of testing and certification facilities to meet these requirements. Harmonisation would not only provide clarity for donors of food aid, but it would make the option of regional procurement more feasible and also remove a potential barrier to trade in food by the private sector. The co-ordination of fortification requirements for maize would also have similar positive spin-offs for improving food security in the region.

Annex: List of stakeholders

Agri South Africa
Department of Trade and Industry, South Africa
National Department of Agriculture, South Africa
Department of Science and Technology, South Africa
Trade Law Centre of Southern Africa (tralac)
USAID, Lusaka, Pretoria and Washington, DC
Professor Loretta Feris, Associate Professor of Law, University of Pretoria
Professor Johan Kirsten, University of Pretoria
World Food Programme, Johannesburg, Lusaka and Maseru
Department for International Development, Lusaka, Maseru and Pretoria
Oxfam
AfricaBio
Grains SA
South Africa Agricultural Processors' Association
Floor Incorporated
FEWS NET, Southern Africa, Zambia
VAC Lesotho
UN Office for the Co-ordination of Humanitarian Appeals, Johannesburg
C-SAFE, Lesotho
Ministry of Trade and Industry, Co-operatives and Marketing, Lesotho
Ministry of Agriculture, Lesotho
Disaster Management Authority, Lesotho
Ministry of Justice, Zambia
Food Reserve Agency, Zambia
Millers' Association of Zambia
Ministry of Agriculture, Zambia
National Farmers' Union, Zambia
COMESA Secretariat
Ministry of Commerce, Trade and Industry, Zambia
Disaster Management and Mitigation Unit, Vice President's Office, Zambia
US Department of Agriculture, Pretoria
Regional Hunger and Vulnerability Programme

Chapter 7

Survey of South African Stakeholders' Perceptions of Production of and Trade in Genetically Modified Foods

Nkululeko Khumalo[1]

INTRODUCTION

In October 2005 AfricaBio and SAIIA, with the support of South Africa's Department of Science and Technology, conducted a survey to determine perceptions of and attitudes towards biotechnology and GM foods in South Africa. The focus group comprised those engaged in agricultural production and research. A questionnaire was sent out to various stakeholders, and follow-up interviews were conducted with those that responded. This report analyses the results of that survey.

Background and literature review

As a background to both the quantitative survey and the qualitative interview results that follow, this section gives a brief review of some existing literature on South Africa's involvement in production and consumption of and trade in GMOs.

South Africa has adopted a positive science-based approach to biotechnology in general and GMOs in particular. As a result of its commitment to biotechnology research and development, it has enacted the Biotechnology Strategic Plan[2] and created biotechnology research innovation centres. In addition, the government has initiated a three-year programme to improve public understanding of biotechnology that seeks to promote informed decision making among the population.[3]

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1 NKULULEKO KHUMALO is a Senior Researcher: Trade Policy at SAIIA.

2 http://www.pub.ac.za/resources/docs/biotechstrategy_2002.pdf.

3 See Sithole-Niang, Idah, Joel Cohen and Patricia Zambrano, 'Putting GM technologies to work: Public research pipelines in selected African countries', *African Journal of Biotechnology*, 3, 11, November 2004, pp. 564–71, available at http://www.academicjournals.org/AJB.

As noted in the National Biotechnology Strategy, South Africa is also inspired by the progressive approaches to biotechnology espoused by some fellow advanced developing countries like China and Brazil. These countries were 'quick to identify the potential benefits of the technology and have established measures both to develop such industries and to extract value where possible and relevant'.[4] Further, it seems that South Africa's biotechnology strategy has had a significant impact on global attitudes to GM technology. For example, James lists South Africa among the five leading developing countries 'that will exert leadership and have a significant impact on future adoption and acceptance of biotech crops globally, because of their significant role in biotech crops and generally in world affairs'.[5]

One of the most important studies so far undertaken on this subject is the National Biotechology Survey commissioned by the Department of Science and Technology and Egoli Bio Life Sciences Incubator in 2003.[6] The aim was to shed light on biotechnology activities in South Africa. The results of this survey are extremely useful as they give a sense of how big the biotechnology industry is, who the main actors are, the challenges being faced and prospects for growth. In particular, the survey highlights the following factors about the biotechnology industry in South Africa:

- Though small by international standards, the biotechnology industry in this country has great potential for further development. Current biotechnology activities span the full range from fundamental research to product development and commercialisation, and include services that make use of biotechnologies, as well as support services for biotechnology stakeholders.
- The majority of biotechnology products fall under the human health (23%) and support services sectors (20%), followed by the plant sector (18%).
- In 2003 about 106 companies participated in biotechnology activities, including 47 core and 59 non-core biotechnology companies/organisations.[7] Their total turnover for 2002 was more than R300 million.
- More than 70% of the core biotechnology companies surveyed exported their products or services, although overall, exports did not amount to much. Trade

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4 See second paragraph of the Biotechnology Strategy's Executive Summary, available at http://www.pub.ac.za/resources/docs/biotechstrategy.2002.pdf

5 James C., *Preview: Global Status of Commercialized Biotech/GM Crops: 2004*. ISAAA Briefs No. 32. Ithaca: ISAAA, 2004.

6 See http://www.dst.gov.za/publications/reports/dst_biotechnology_strategy.pdf.

7 The list of biotechnology companies does not include the larger brewing, food and beverage, and wine companies, unless they are involved in developing innovative products using modern technologies.

data was difficult to get hold of: a fact that the authors attribute to the cross-cutting nature of the technology and a lack of appropriate classification.

- A total of 622 research groups were involved in biotechnology-related activities, and a total of 911 projects relevant to biotechnology were identified, including projects undertaken by both research and industry stakeholders.
- Approximately 43% of the core and non-core biotechnology companies identified together employed a total of around 1,020 staff in biotechnology-related activities, while approximately 26% of the research groups identified together employ a total of around 950 staff members/students.
- On the regulatory front, South Africa has an established biosafety process that reviews all activities concerning GMOs and has recently ratified the Cartagena Protocol on Biosafety, which regulates the trans-boundary movement of LMOs.[8]

It is also clear from the reviewed literature that though much has been done to improve the industry as a whole, a number of constraints remain, particularly with regard to wider acceptance of the GM technology by consumers; ensuring that poor producers (like small holder farmers) access the technology at reasonable costs; and fostering export growth. In short, the National Biotechnology Survey shows that much still needs to be done in order to create an enabling environment that allows stakeholders to maximise the benefit derived from the potential of biotechnology, while minimising the possible risks to the environment and human health.

The SAIIA/AfricaBio survey sought to build on and complement existing research on biotechnology activities in South Africa. As such, the scope of the enquiry was restricted, and the questionnaire was drawn up primarily to elicit specific information and views from those entities engaged in the production and consumption of and trade (importers and exporters) in GM crop products, and does not cover the biotechnology industry as a whole.

METHODOLOGY

A questionnaire was sent out to 280 entities believed to be involved in the abovementioned biotechnology activities, and a deadline was set for return of

8 Legislation relevant to biotechnology includes the Patents Act of 1978 and two amendment bills passed in 1997, the Counterfeit Goods Act and the Intellectual Property Laws Amendment Act; the Genetically Modified Organism Act No. 15 of 1997; regulations for the labelling of food derived from genetic modification; Act 36 of 1947 governing agricultural products; the Plant Breeders Act; the Biodiversity and Protected Areas Acts; and the Medicines Control Act No. 101 of 1965.

completed questionnaires. The initial response was not satisfactory, and the deadline was later extended, and follow-up with certain stakeholders identified as clearly involved in GM production, consumption and trade was done. In the end, and due mainly to the restricted nature of the enquiry (it does not cover the wider industry), 35 replies were received.

Further, in order to get better clarity on certain critical issues, face-to-face interviews with a representative sample of South African stakeholders were conducted after the survey. The final analysis in this paper is therefore informed by both the survey responses and the interview results.

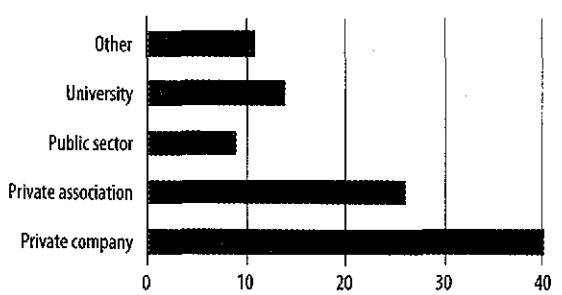
Though it is relatively small, the sample group represents significant portions of South Africa's agricultural production (encompassing primary producers, industrial users and processors) and research establishment. And while there is considerable scope for the results to be more or less representative/accurate, they are nonetheless significant as an indicator of general perceptions and actual experiences of companies and other entities involved in the specified biotechnology activities.

COMPANY CHARACTERISTICS/INSTITUTIONAL DETAILS

Respondents' business sectors

The first survey question sought to give a perspective on which sector of the South African economy our respondents belong to. It is not surprising that the overwhelming majority of them come from the private sector: 40% are private companies, 26% are private sector associations and 14% are universities. As Figure 1 illustrates, 11% of the respondents belong to other sectors, including a civil society organisation and an agricultural union.

Figure 1: Business categories of respondents



Main activities, number of employees and years of operation

The respondents' list was quite representative in terms of economic activities being undertaken (see Figure 2). Primary agriculture producers accounted for 23% of the surveyed entities, whereas 26% of respondents' main activities are 'other', including those trading in animal feed and grains. A substantial proportion engage in more than one of these activities. Some of South Africa's well-established economic actors and employers were part of the survey – at least 40% of them have a considerable number of employees, ranging from 100 to more than a 1,000, and about 71% of these organisations have been in existence for more than 10 years (see Figures 3 and Figure 4).

Figure 2: Main activities of survey respondents

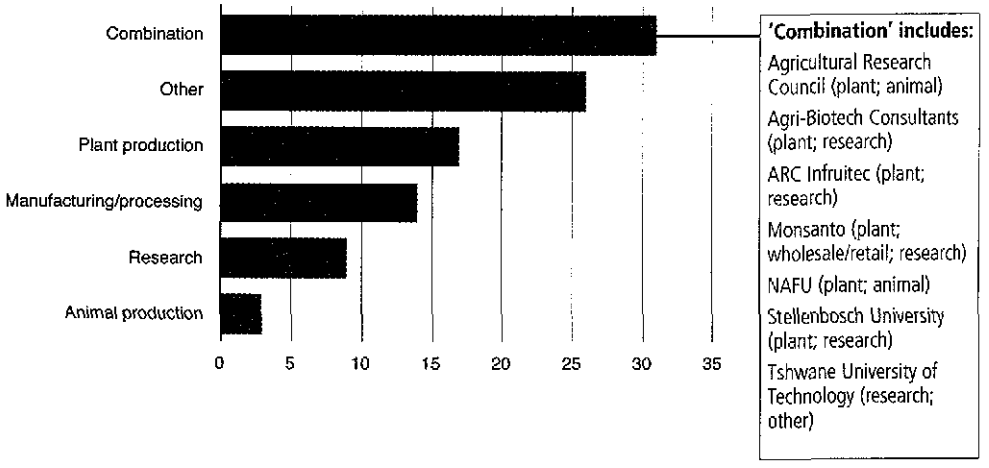


Figure 3: Number of people employed by respondents

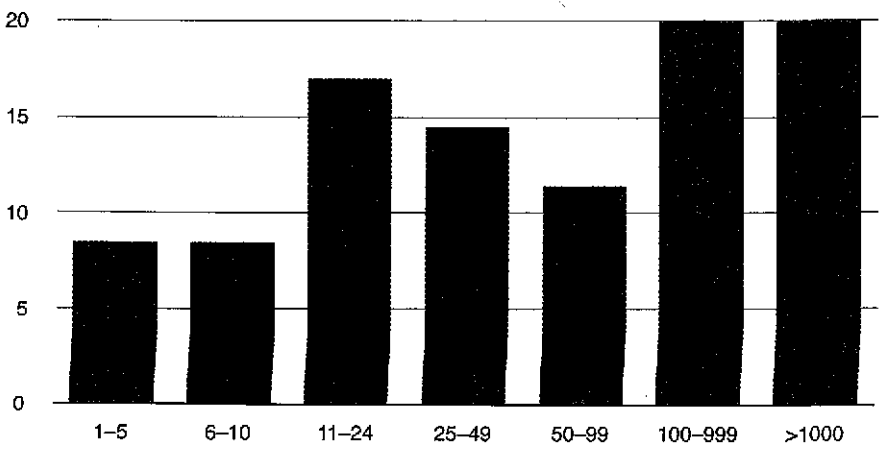
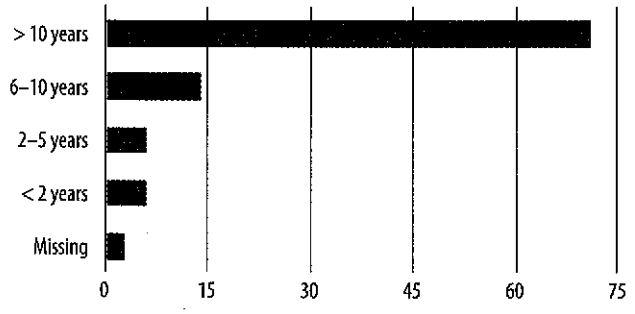


Figure 4: Age of the organisations that responded



TRADE AND TRADE-RELATED ECONOMIC ACTIVITIES

A number of questions sought to elicit information regarding the organisations' involvement in trade and trade-related activities, and what experiences they have had in trading in GM products. To this end, respondents were asked whether they export internationally, where their major markets are, and whether they trade in GM products, non-GM products or both. Further, if an organisation does trade in GM products, it was asked whether such products are LMOs, such as grain seeds for planting; or processed non-living products like milled GM maize products; or whether they trade in both. The questions were meant to show what challenges are encountered when trading in specific products and to highlight areas where corrective policy interventions could be appropriate.

Almost half the respondents – 17 out of 35 or 49% (see Figure 5) – export internationally. However, from the follow-up interviews, it emerged that the export market is very important – between 20% and 50% of products are for export for at least one-third of the companies (4 out of 12 who made comments on this). For the rest, only a meagre portion of their overall production is for export – one of the interviewees said this is the result of a plethora of difficulties the organisation faces when trying to get permits to export certain products to some countries.

Of the 17 companies that export internationally, it was important to know where their major markets are. The most important export destinations for the respondents exclude all traditional export destinations like the EU and US. Instead, 10 have SADC as their main export destination, 8 have the rest of Africa as their second-most-important export destination, and 3 have Latin America as their third-most-important export market (see Table 1).

Figure 5: Respondents which export their products

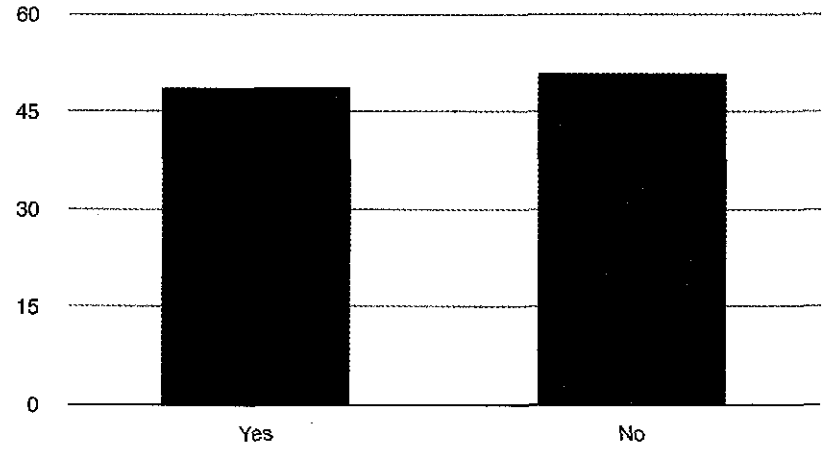


Table 1: Export markets (ranked by total)

	1st	2nd	3rd	4th	Total
SADC	10	3	0	0	12
Rest of Africa	4	8	0	0	12
EU	1	3	3	1	8
Asia	2	1	2	0	5
Latin America	0	1	3	0	4
Middle East	1	1	0	0	2
North America	1	1	0	0	2
Australasia	0	0	1	0	1

Unfortunately, 13 respondents did not answer the next question concerning the mix between GM and non-GM goods traded. Of those who answered, just 3 companies trade only in GM products, while 7 trade in both GM and non-GM products (see Figure 6). Further, about 24 respondents who trade in GM products did not indicate whether they trade in LMOs, or non-living processed products, or both. Of those that did, 6 export LMOs, while only 2 trade in both (see Figure 8).

Of those who trade in LMOs, 28 respondents did not indicate what type of LMOs they trade in (ie. whether they trade in FFPs; in LMOs for research; or in LMOs for planting). Of those that did, 4 trade in FFPs (see Figure 8).

Figure 6: Trade in GM products, non-GM products, or both

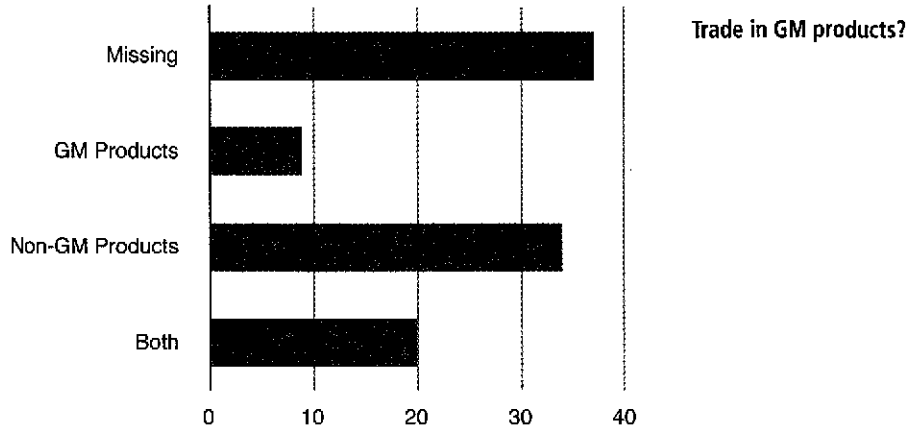
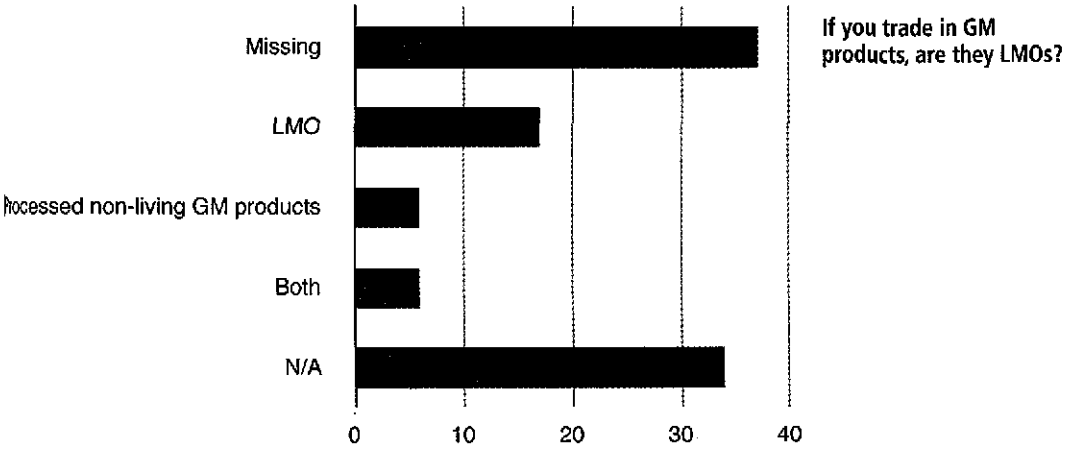
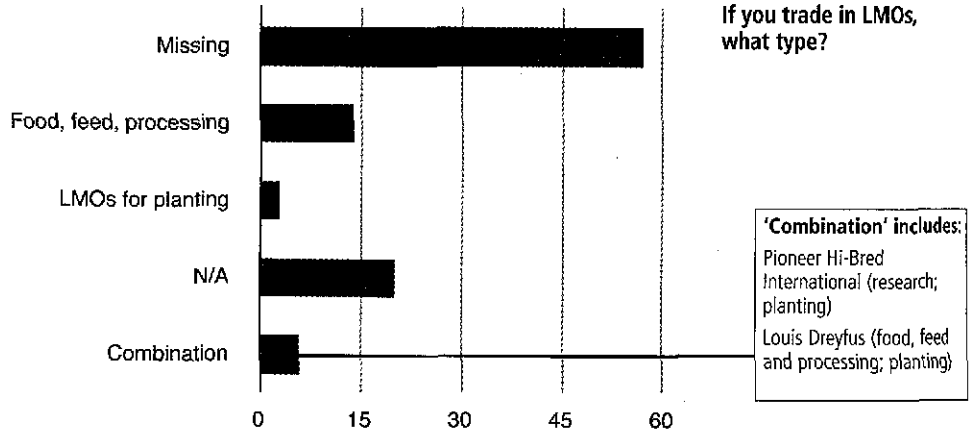


Figure 7: Trade in LMOs, processed non-living GM products, or both



From the information above, at least 10 (3 worked with GM products only, and 7 in both GM and non-GM products) out of 35 respondents are involved in production of GM products and/or trade. It seems the majority of those that work with GM products deal mainly with FFPs, and only 2 work with LMOs for planting in addition to FFPs, and GM products for research. This may indicate that there are some obstacles in engaging in the production of GM products in this country and in this region.

Figure 8: Types of LMOs traded



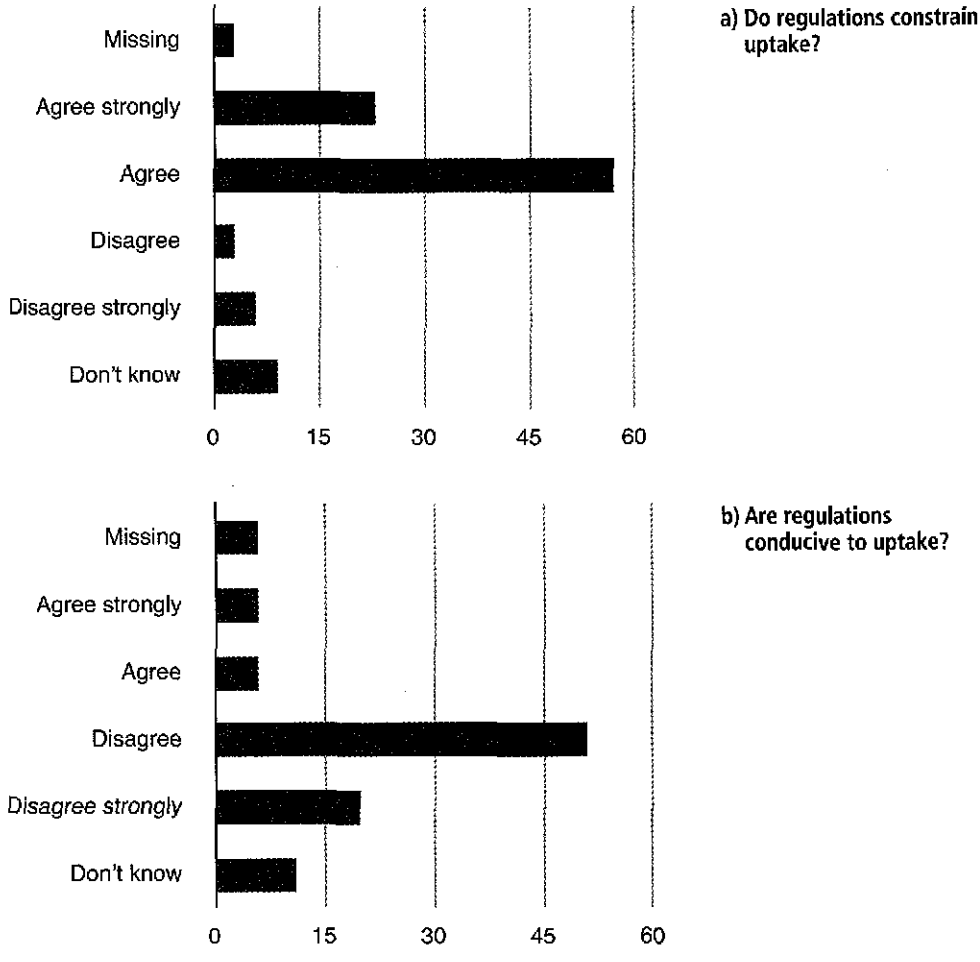
PERCEPTIONS OF GM PRODUCT TRADE AND PRODUCTION IN SADC

GM regulatory regimes and food security issues

A total of 82% of respondents are of the view that current regulatory regimes in Southern Africa have the effect of constraining biotechnology uptake and have a negative impact on food security (see Figure 9). Only 10% of the respondents believe there is nothing wrong with the regulatory regimes; ie. the regimes are to them conducive to biotechnology uptake and positively affect food security (see Figure 9).

Again, the follow-up interviews sought to give these organisations a chance to contextualise their positions. A number of reasons were given, and according to one interviewee, part of the regulatory challenge is that GM technology is developed overseas and then packaged and exported to Africa. Governments therefore feel the need to minimise the risk the technology poses to current cultivators that have taken years to adapt to the particular conditions in their country. He also noted that the biggest regulatory problem is that there are in fact no regulations in place in most SADC countries. This is problematic, because without regulations, GM technology cannot be dealt with objectively on a case-by-case basis, but rather a blanket 'no' is applied to all GM products.

Figure 9: The effects of regulatory regimes on biotechnology uptake



Furthermore, 94% of respondents (71% plus 23% in Figure 10) see GM technology as having a potential to contribute to tackling structural food security problems in SADC and across the continent.

Trade barriers affecting trade in GM products

International barriers to trade in GM products are apparently not the biggest problem for most respondents. Only 34% are experiencing trade barriers. Yet this does not necessarily mean that these are not significant (see Figure 11). For instance, since 53% of those who answered this question said such barriers were not applicable to them, it is likely that they are not involved in exporting

and/or importing GM products internationally or regionally.

Figure 10: Biotech and food security challenges in SADC/Africa

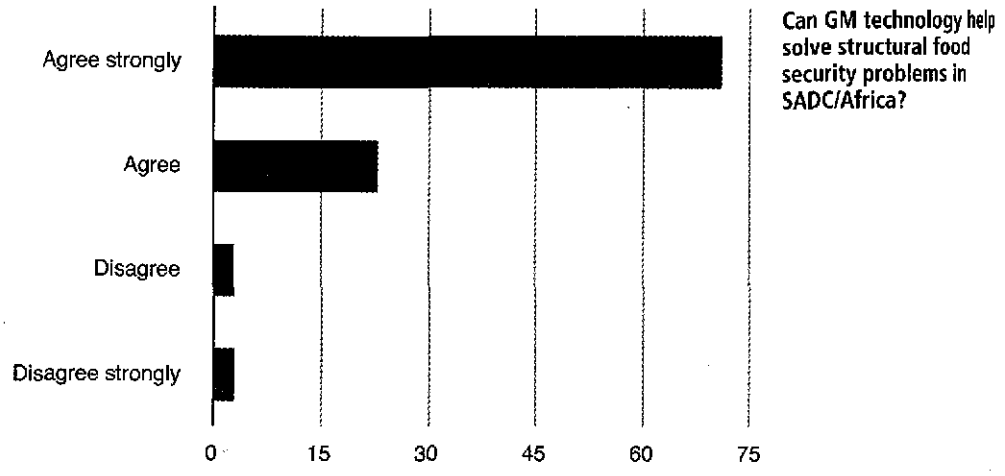
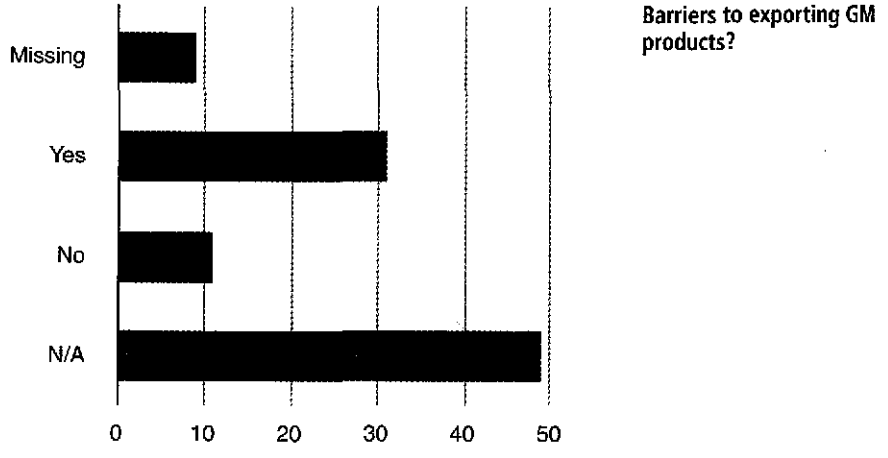


Figure 11: Barriers to exporting GM products



Respondents that do experience barriers were requested to indicate how relevant some specific potential barriers were to their businesses. The given set of barriers included: the provisions of South Africa's GMO Act 15 of 1997; unfavourable consumer perceptions and preferences in importing markets;

regulatory barriers in export markets; concerns about the potential impact of the provisions of the Cartagena Protocol; purchasing decisions by companies in importing countries; and 'other' barriers.

Table 2: Relevant barriers to export of GM product

Q13 – Types of barriers experienced	Very relevant	Relevant	Hardly relevant	Does not apply	Total responses
SA's GMO Ad (15/1997)	1	3	4	4	12
Unfavourable consumer preferences	5	3	3	3	14
Regulatory barriers in export markets	6	4	0	3	13
Unfavourable purchasing policies in export markets	4	4	0	3	11
Concerns over impact of Cartagena Protocol	3	4	0	4	11
Purchasing decisions by companies in export markets	3	5	1	2	11

From the results given in Table 2, it is clear that the respondents consider all the potential barriers specified to be mainly either relevant or very relevant and thus they need to be dealt with. The most problematic barriers seem to be the regulatory barriers in export markets (10 respondents out of 35 found them to be either very relevant or relevant). Since much of the export market for these companies is within SADC and Africa, it means that there is a lot that African countries – particularly countries of this region – could do to ameliorate these barriers.

The provisions of South Africa's GMO Act, while still significant as a barrier, were indicated as the least problematic (4 out 35 respondents found them either very relevant or relevant). However, in the follow-up interviews, one stakeholder noted that 'the SA GMO Act will be a major problem should we have a maize shortage in the future because it does not allow maize to be imported'. This shows that South Africa itself still has a long way to go in finding better ways to regulate biotechnology – it remains to be seen whether the proposed amendments to this act would make a difference. It is also important to note that some respondents indicated that the lack of regulatory regimes in other countries is in itself a barrier to trade.

Respondents were also asked whether they do meet some GM-related requirements in their professional requirements. The list of such potential requirements included the following categories (see Table 3): customs services in

the importing countries (eg. through documentation requirements); purchasing managers of their clients (eg. through general conditions in their purchasing contracts); clients, through testing on GM presence; and trading partners.

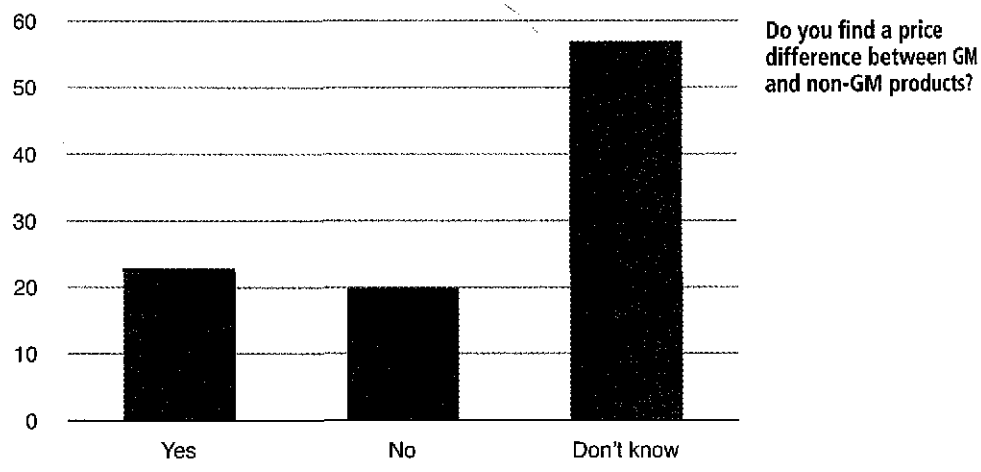
Unfortunately, about 49% of respondents did not answer this question. From those that did answer, 71% and above say the requirements above apply in their professional relations (see Table 3).

Table 3: Do companies meet GM-related requirements?

GM-related requirements from ...	Yes	No	Total responses
Customs services in the importing countries (eg. through documentation requirements)	13	5	18
Purchasing managers of your clients (eg. through general conditions in their purchasing contracts)	12	5	17
Clients, through requirements for testing on GM presence	13	3	16
Trading partners	11	4	15

The survey also sought to find out whether there are price differentials between GM and non-GM products – in other words, to know whether GM products come with a cost to exporters. As Figure 12 illustrates, the majority (57%) of the respondents do not have an opinion about this, and only 23% said they do. Yet this seems to be quite a significant problem – one stakeholder averred in

Figure 12: Price differentials between GM and non-GM products

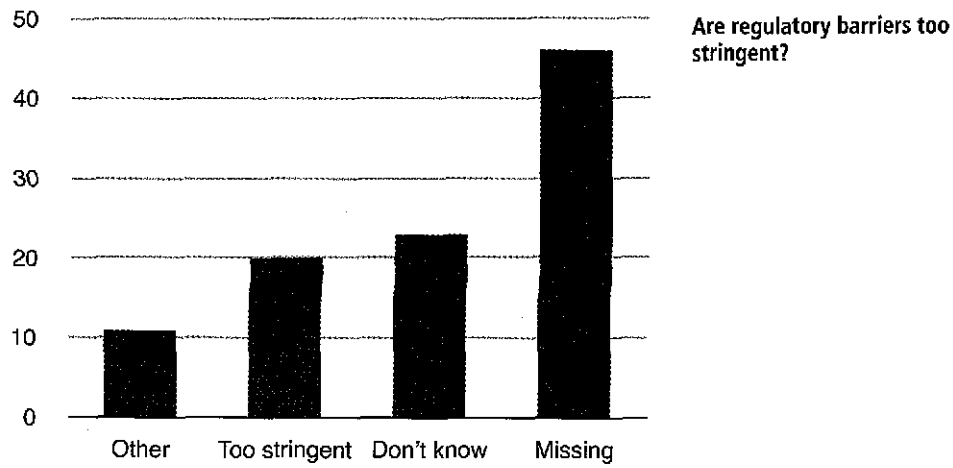


the follow-up interviews that price discrimination against GM products leaves companies sitting with GM crops that they cannot sell, leading to an overall depression in the market.

Stakeholders that face regulatory barriers in export markets were further asked to indicate whether such barriers are too stringent, or they do not know, or 'other' (and to go on to state what such 'other' barriers may be). From the results given in Figure 13, apart from the fact that 46% of respondents did not answer the question, the majority did not know, while 20% said the barriers were too stringent. Another problem cited in the interviews is uncertainty – some stakeholders find the existing regulations ambiguous and confusing, especially some provisions of the Cartagena Protocol, upon which most African countries seem to model their own regulations.

For those who indicated 'other', there were some mixed reactions – some are concerned about the safety of GM products and hence find the barriers to be appropriate, while others bemoan the lack of definitive and consistent regulatory systems, rules and procedures.

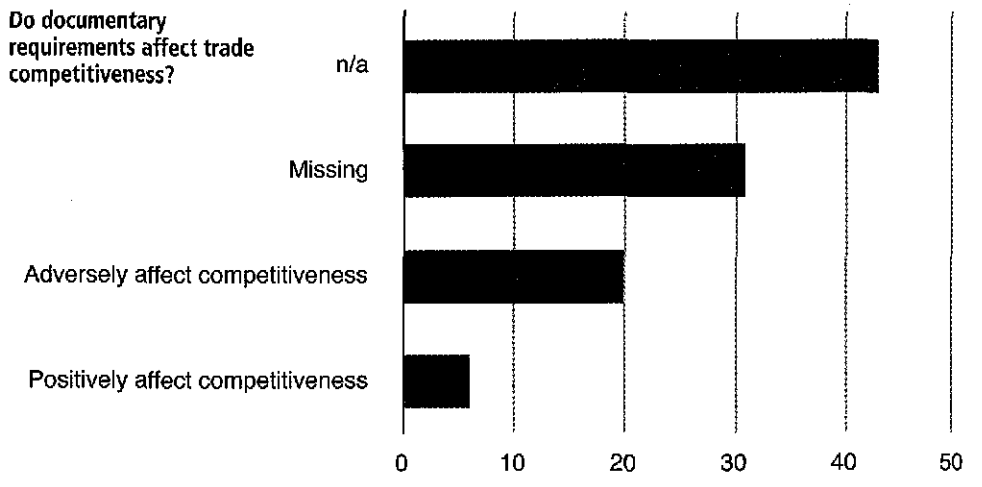
Figure 13: Regulatory barriers in export markets



Since a number of countries have adopted a system of labelling products as to whether they are GM or non-GM, it was therefore necessary to ask the respondents if such documentary requirements affect the competitiveness of their products in domestic and international markets. About 31% did not answer this question. Of those that did, 63% said this did not apply to them, and 21% indicated that these requirements adversely affect their competitiveness (see Figure 14). This is clearly

an issue worth taking into account, especially with negotiations on the Cartagena Protocol still going on, even though few respondents put it as a problem.

Figure 14: The impact of documentary requirements on trade competitiveness



Respondents were then asked what in their view could be the effects of a more liberal GM-product regulatory regime. The results as shown in Table 4 indicate that the majority of respondents believe that such a regime could benefit the SADC economy in general (53%) and a significant number of them believe it could encourage their organisations to adopt GM technology or to expand GM-related activities.

Table 4: Potential impacts of a more liberal biotech regime

Q18 – A more liberal trade regime for biotech products would ...	% of total responses
Benefit the SADC economy	49%
Have no effect on my organisation's productivity/profitability	15%
Greatly increase my organisation's productivity/profitability	13%
Encourage my organisation to adopt or expand GM activities	13%
Increase my organisation's productivity/profitability	11%
Total responses	47%

Another very important issue that has tremendous implications for trade competitiveness of South African companies and general food security in the region is how donor food aid is used or abused in this region. Such food aid

could either be GM, or non-GM, or a mixture of the two. One particular problem that has been identified in the WTO context is that food aid sometimes has the unintended effect of depressing prices of commodities and displacing domestic farmers. The respondents were asked how they think this issue should be dealt with. The results shown in Table 5 suggest that the majority of respondents are in favour of a system where such food aid is preferentially sourced from within the region. This may not come as a surprise: South African producers stand to benefit from such a system.

Table 5: Addressing food aid problems

Food aid should be ...	Agree strongly	Agree	Disagree	Disagree strongly	Don't know	% agree strongly or agree
... preferentially sourced within SADC	13	14	3	0	1	87%
... sourced from anywhere, but be milled to prevent accidental planting	1	12	10	3	4	43%
... sourced from anywhere	0	6	4	0	2	50%
... given in monetary terms	3	3	4	9	6	24%

Potential advantages of producing GM crops

A few questions were aimed at evaluating overall views about potential advantages of producing GM crops as compared to their organic counterparts. It was also necessary to get the respondents' views on what they think should be done to increase biotech uptake and adoption, if that is necessary.

The majority of the respondents (a combination of those who agree and those who agree strongly is 91%) believe that the potential benefits from growing GM crops outweigh the costs of the technology (see Figure 15). A good number of our respondents believe GM applications have the potential to offer higher yields than non-GM seeds (see Figure 16). However, in their comments, some respondents and interviewees expressed their concerns about the high prices of GM seeds and found it to be one of the hindering factors to small producers who wish to plant such seeds.

Further, most respondents and interviewees also think that small-scale farmers should be encouraged to use GM technology (see Figure 17). To justify their position, they noted in the comments section that since GM crops are more resistant to pests, small-scale farmers would benefit from increased yields and decreased inputs such as chemical pesticides. They therefore stress the need for

Figure 15: GM production: costs and benefits

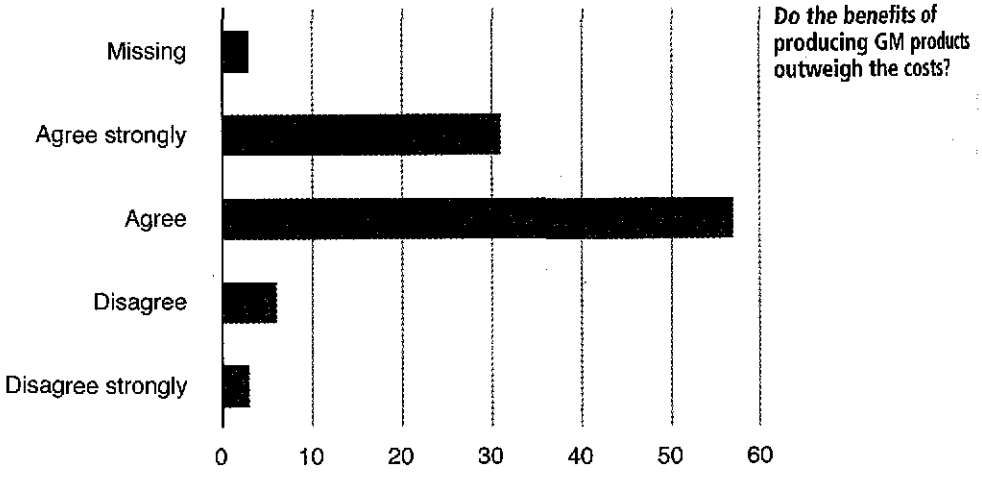
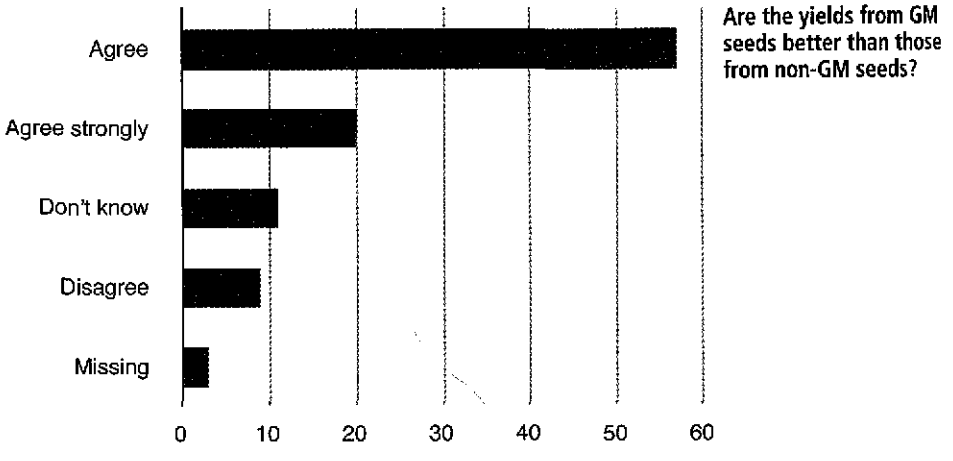


Figure 16: Yields from GM seeds and non-GM seeds



an enabling regulatory environment so that small-scale farmers benefit from GM technology.

In order to promote biotechnology uptake and acceptance (which most respondents believe is potentially beneficial to the SADC region), most of the entities surveyed think it is important for consumers to have access to objective scientific information about the technology and be able to make decisions based on sound knowledge. As Table 6 reveals, there is concern about lack of sufficient flexibility in regulatory regimes in the region. This is not to say that this is a problem peculiar to SADC; many regions of the world face similar problems. The point is, SADC should act out of enlightened self-interest and do all it

can to promote policies that can contribute towards solving its endemic food insecurity.

Figure 17: GM crops and small-scale farmers

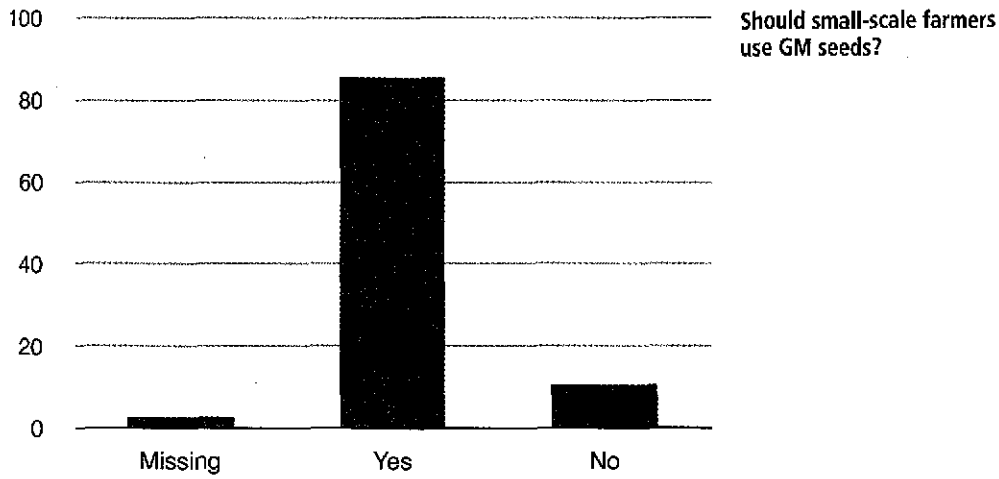


Table 6: GM uptake and acceptance

Q23 – What should be done to increase uptake?	% of total responses
Consumers should have access to scientific information on GM technology	39%
Regional regulatory approaches should promote adoption and acceptance of GM technology	34%
National regulatory regimes should be more flexible	24%
Others (please specify)	3%
Total responses	74

OTHER COMMENTS

The survey sought to give respondents flexibility and an opportunity to comment on other issues not covered in specific questions. Though there is a great degree of concurrence on certain issues, the remarks also reflect the diversity of respondents' views and experiences. Some of their comments are outlined below:

- There will continue to be a place for both GM and non-GM products. We need cost-effective strategies and systems to allow access to both.
- Organic agriculture produces just as much food per hectare over the long term, and the food quality is superior to GMOs.

- Biotechnology is one of the many tools needed to ensure sustainable food production.
- GM foods will be to the benefit of Africa because of its unpredictable climate.
- GM technology is less labour- and cost-intensive.
- Technology should be accessible in a safe and responsible manner to all. Education, awareness, access and choice are needed. Regulatory regimes and services at such authorities overseeing the implementation should be enabling.
- Most consumers and farmers do not really care about this issue and therefore need to be educated about it.

ANALYSIS

As mentioned at the outset, the results of the survey are complemented by face-to-face interviews. Therefore the final analysis is informed by both the survey responses and the follow-up interviews.

Most of the organisations, even those not using or trading in GM products, believe that this technology is potentially beneficial and should, at least, be researched more. There are exceptions, of course, but the balance of opinion is in favour of promoting GM-friendly policies. It is particularly interesting to note that most of the respondents called for more research before dismissal or acceptance of this science. This is evident in that although 55% trade in non-GM products, a full 94% of respondents thought GM could help with food security and 88% believed that small-scale farmers should be encouraged to use this technology.

Challenges in export markets

Most of the respondents do export a substantial amount, and therefore the opinions and attitudes to GM in these markets cannot be ignored. It is clear from the survey results that SADC and African markets are the most important for South African exporters of GM products. As such, it would be worthwhile for efforts to harmonise regulatory regimes, provide consumers with objective scientific information about GM, etc. to be focused on these markets.

This understanding should also inform the positions the South African government adopts when it comes to negotiations in international forums such as the negotiations on the provisions of the Cartagena Protocol. Such positions

should therefore reflect South Africa's growing interest as a GM-product exporting country.

Effect of existing regulatory regimes

The majority of respondents agreed that SADC regulations constrain biotech uptake and food security. It was suggested that since SADC countries do not have sufficient information on this technology, they should promote research on it rather than dismiss it out of hand. One interviewee even suggested that SADC countries should develop their own demonstration plots to see the results of GM crops before they decide what their policy will be. Respondents repeatedly mentioned that in some cases the main problem is the complete lack of regulations in place rather than the regulations themselves – regulations are necessary and not having them is more harmful than prohibitive regulations.

The uniform response to this question from so many different stakeholders cannot be ignored and should be read as a warning sign that these regulations need to be revised. It is obvious that most respondents would welcome a revision of these regulations, and that the ideal would be for them to be streamlined. Documentation, cross-checking, verification, re-checks, further questions – all of these hindrances, though sometimes necessary, are costly to both exporters and importers.

Almost all interviewees said that they have experienced clients demanding stricter requirements to be met than are actually legal. These respondents have therefore been forced to develop a clear understanding of what the actual requirements regarding GM products are according to international and regional laws. This information should be easily available to all stakeholders.

Food security

Most survey respondents and interviewees agreed that GM technology could contribute to solving food security problems in Africa. The responses picked up a number of similar threads. Respondents are of the view that GM technology allows for fewer inputs, but higher output, and that this formula is especially helpful to resource-poor informal farmers. Some interviewees who are currently engaged in GM crop production asserted that the proof of GM crops offering higher yields is available in South Africa.

If GM technology actually allows more food to be produced at a lesser cost, as most respondents claim, it follows that encouraging its use would help SADC to

achieve food security. This is even more imperative considering that the majority of farmers in this region are poor and cannot afford high-tech farming inputs and have limited technical farming skills, and thus need a higher yield to ensure that their families are fed each year.

The main problem, however, is the cost of GM seed. This was generally attributed to lack of competition in the seed production industry; of course, this is potentially also a function of intellectual property rights regimes. As such, competition is needed in this market to drive prices down. Also, an environment more accepting of GM technology would drive the price down, since as soon as a product is considered conventional rather than specialised, its price will drop.

Related to food security is the issue of food aid. Most respondents and interviewees believe food should be preferentially sourced within the SADC market. This is not surprising, as it reflects concerns about the potential of food aid from other regions (especially food aid dependent on subsidies in developed countries) to displace local producers. It is interesting to note that few respondents and interviewees think food aid should be given in monetary terms – this may be a result of concerns about how the money would be handled and the potential for slow supply response in times of emergencies. Opinions on how to address the food aid issue are important indicators of what kind of regime could ultimately be agreed upon at the international level.

Barriers

The biggest barrier to trade seems to be regulations in importing countries and their unfavourable purchasing policies – some countries simply do not want GM food. This goes back to the already mentioned difficulty with poor or no regulatory frameworks and governments' responses to EU concerns about GM products.

In the interviews, the South African government was praised for doing its best to understand and implement the Cartagena Protocol and allowing research and trade in GM, but was criticised regarding its GMO Act that apparently restricts GM maize imports.

Public and regional education as to what GM technology actually involves is a necessity, as one of the barriers to trade is that people simply do not understand what GM technology is and therefore reject it out of fear of the much-hyped

unknown risks. Projects aimed at increasing the public's understanding of biotechnology are necessary and positive.[9] These must be expanded, both in scope and in target audience. Public understanding of biotechnology is also particularly useful because it is a government initiative and not a pro- or anti-GM group, which makes its findings more credible.

One of the reasons for anti-GM perceptions not listed in the survey is that the GM versus non-GM issue has been over-publicised. One of the interviewees noted that if the pro-GM group had not publicised their work so well, then it would not have developed into such a contentious issue. Genetic modification of food products has been going on in various forms for hundreds of years, but only became a problem when it was publicly discussed.

'Concerns about the Cartagena Protocol' constitute a significant barrier, because few people actually understand it or know what some of its provisions entail. And more importantly, negotiations on some critical provisions like article 18.2, which deals with documentary requirements, are still going on.

Costs and benefits

Most interviewees thought that the benefits of GM technology outweigh its costs, even though the costs are still a significant barrier to potential users.

Clients demanding non-GM products

The countries repeatedly mentioned as demanding GM-free products are Zimbabwe, Zambia, and Malawi. Also noted were Namibia, Kenya, Mozambique and Saudi Arabia.

Some clients even request that right from the source it must be guaranteed that the product is GM free; yet this cannot be 100% guaranteed and therefore a minimum level or threshold has to be used instead.

All of the traders said that the cost of providing GM-free documentation is large, and therefore the clients are charged for it in the initial costs, because this cost cannot be recovered any other way.

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9 For more on the need to increase public understanding of biotechnology, see http://www.dst.gov.za/publications/reports/dst_biotechnology_strategy.pdf.

CONCLUSION

It can be deduced from both the survey responses and the results of the face-to-face interviews that biotechnology regulations – those in place and those developed – must be streamlined, at least within the SADC region. The different regulations in each country make import and export difficult, and therefore a common policy should be worked out that can accommodate both pro- and anti-GM countries. Also, regulations must become public international knowledge so that clients cannot demand more than is necessary from producers. An international database of legal GM requirements should be established so that all stakeholders are aware of the law in their trading partners' countries.

The results also stress the need for GM research carried out in a strictly scientific and safe manner to be used as a basis for decision making. Education is the main issue that needs to be addressed and it is important for stakeholders to acquire sufficient objective information about the pros and cons of GM technology. The results also show that most stakeholders see GM technology as potentially very beneficial and that, with the correct regulations and biosafety frameworks, it can contribute in a large way to food security in Africa. The South African government recognises the potential of this technology and should therefore endeavour to share this understanding with other SADC countries.

Index

[redacted]E IN GENETICALLY MODIFIED FOODS
Decoding Southern African Regulatory Approaches

A plethora of factors conspire to make Southern Africa unable to feed its population leading, in some cases, to excessive reliance on donor food aid. In particular, the poor adoption of modern farming techniques constitutes a serious challenge to African agriculture in general. This situation is untenable especially at a time when agricultural biotechnology is being increasingly used to bolster food production in a number of countries across the world. While this technology is not a panacea, its contribution could go a long way towards alleviating the effects of climate induced droughts and concomitant human starvation.

Yet this is highly contested terrain. The polarised global debate over the safety of genetically modified organisms (GM) and their products to human health and the environment negatively affects SADC countries' uptake of this technology. Apart from safety concerns these countries have been careful to take regulatory measures that would not offend their powerful external trading partners, especially in the European Union.

This pathbreaking book argues for an enlightened GM regulatory approach in SADC that is fully informed by domestic realities and needs. Its chapters highlight some of the causes of and challenges posed by food insecurity in the region; stress the need for the adoption of biotechnology within a responsive regulatory environment that would allow maximum benefits from this technology while mitigating its associated risks; and stress the need for harmonisation of such regulatory frameworks in order to foster trade in GM products and to ensure that GM food (food aid or commercial purchases) can be economically and efficiently transported from surplus areas to drought-induced deficit areas. In addition, African countries are urged to continue to participate actively in global food aid policy-making bodies so as to safeguard their interests.

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