

BIOTECHNOLOGY AND THE POLICY PROCESS: ZIMBABWE

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SUMMARY

This paper is produced as part of the IDS project on 'Biotechnology and the policy process: challenges for less developed countries'. This project seeks to untangle the policy process in three very different developing countries: China, India and Zimbabwe. A central focus of the project is to understand how poor people's perspectives can effectively influence the policy process in order that future developments in agricultural biotechnology meet their livelihood needs in a sustainable manner. This paper examines the policy context for biotechnology in Zimbabwe. Its objective is to set the basis for further research and is essentially a 'map' of what exists as opposed to a deep theoretical exploration. It explains the main features of policy processes that influence and inform the development of policy on biotechnology. It considers in broad terms how it has evolved and in particular the events, processes and institutions that have influenced the form it has taken.

The paper focuses on three areas. Firstly, it looks at the national policy framework, identifying key development and economic policies and in particular considering the implications of policy on food security and development. The policy frameworks for environmental management, particularly in the areas of risk assessment and access to genetic resources, are considered. This section concludes that the general policy framework is supportive of the development and use of biotechnology. The legal framework in which policy initiatives take place and the legal process for evolution of law and policy is considered. Secondly, the paper identifies the predominant perspectives on biotechnology. These include the issue of food security, bio-safety, access to genetic resources and Zimbabwe's

economic strategies and its dependence on export markets. Broadly these debates reflect positions and approaches that have emerged around the world. Additionally, perspectives on institutions, accountability and representation are considered as this has influenced the current institutional systems for regulation. Thirdly, as an integral part of this discussion of perspectives this paper identifies the positions that key actors have taken and the actor-networks that have emerged. It considers how these have influenced the policy process particularly in the areas of access to genetic resources and intellectual property rights, defining research priorities and bio-safety.

The paper finds that:

1. The policy framework supportive of the development of biotechnology.
2. Economic context and crisis of public sector research funding increasingly opens the door for public sector-research investment.
3. The notion of 'sound science' and the presentation biotechnology as exclusively an issue of science has been the key factor determining both the form and approach of regulation and institutional development.
4. The NGO sector is relatively well developed and influential in the development of policy.
5. The understanding of and approach to participation has been a key factor in shaping the policy process.
6. Resource poor farmers have largely been excluded from the policy process
7. There are inadequate systems for communicating both law and biotechnology to key actors.

8. Approaches to managing or dealing with the uncertainty of the impact of GM crops are highly differentiated and can broadly be split into 'risk' and 'rights' approaches.
9. Actor networks seem to be flexible – being reconstituted in respect of each issue or even sub issue. In some instances positions and roles appear to be the result of hidden tradeoffs between actors.
10. The relationship between the international realm and the national realm seems to be key in a number of ways:
11. Access to resources, and in particular donor funding, seems to contribute to the development of 'policy elites'.
12. Global legal processes, and partnerships with international organisation(s), influence the identification of policy gaps and approaches.
13. Globalisation, and in particular Zimbabwe's membership of the WTO, are key considerations in placing restrictions on economic activities and unfolding policy.
14. The relationship between the local and national level in the policy process is poorly developed.
15. The institutional framework in Zimbabwe is characterised by a high level of interconnectedness between institutions and actors. Consequently the potential for conflict interest in policy making, regulation, monitoring and enforcing is high.
16. Inter-ministerial co-operation is poorly developed.
Competition between ministries for scarce resources seems to be a key factor in shaping institutional relationships.

ABBREVIATIONS

BTZ – Biotechnology Trust of Zimbabwe
BRI – Biotechnology Research Institute
CBD – Convention on Biological Diversity
DGIS - Directorate General International Co-operation
DR&SS – Department of Research and Specialist Services
EIA – Environmental Impact Assessment
ESAP – Economic Structural Adjustment Program
EU – European Union
FAO – Food and Agricultural Organisation
GMO – genetically modified organisms
GOZ – Government of Zimbabwe
IPR- Intellectual Property Rights
IUCN – The World Conservation Union
IUCN ROSA - The World Conservation Union, Regional Office for Southern Africa
LMOs – Living modified organisms
OAU – Organisation of African Unity
PRRK- plant resources-related knowledge
RCZ – Research Council of Zimbabwe
SADC- Southern African Development Community
SI – Statutory Instrument
SIRDC – Scientific Industrial Research Council
TRIPS – Trade Related aspects of Intellectual Property Rights
UNCED – United Nations Conference on Environment and Development
UZ – University of Zimbabwe
WTO – World Trade Organisation
ZFU – Zimbabwe Farmers’ Union

ZIMPREST- Zimbabwe Programme for Economic and Social
Transformation

INTRODUCTION

The evolution of policy is a complex process with a myriad of factors affecting its eventual form, acceptance and effectiveness. On the one hand there are overt factors at the social, political, economic and legal level. Key considerations here would include the legally defined process of law and policy formulation as well as the prescribed roles and authority of decision-makers, stakeholders and other actors. The relationships of power and circles of influence of the various actors will also be key in shaping policy and the processes through which it evolves. These processes are affected and constructed in the context of other national policies, priorities and interests. On the other hand less overt factors may also be key – critical here may be the colonial experience, political and social values, and approaches to governance. Both capacity and approaches to policy analysis, development and implementation are influenced by the colonial experience. For example, how the status of 'scientific knowledge' and 'indigenous knowledge' has been juxtaposed and has consequently supported the prioritisation of science over all others stems from this background. Similarly the historical categorisation of social and agricultural practices (and values) as 'modern' or 'backward' may subtly influence how decisions are made.

This paper maps the biotechnology terrain and in so doing seeks to set the basis to understand and to unravel 'how particular policies and regulatory frameworks emerge and the ways particular perspectives come to dominate and others are excluded in the area of agricultural biotechnology within Zimbabwe.

The paper begins with an exploration of the national context in which policy evolves – key related policies are considered, as is the legal and

institutional framework. This section is essentially descriptive. The second part identifies the predominant perspectives around biotechnology. In so doing it considers how policies have evolved and the role of different actors and actor networks in this process. In conclusion the paper summarises the key features of this context for biotechnology policy development.

NATIONAL CONTEXT FOR BIOTECHNOLOGY POLICY

This section seeks to map the national framework in which biotechnology policy and practices have evolved. Both law and policy and the existing socio-economic-political context set the framework for the development of biotechnology policy and practice. This section identifies key development and economic policies and practices. In broad terms it considers how this may influence private sector involvement and investment and the implications of this for public and private research. Environmental and health laws and policies addressing risks are also identified as these effect perceptions around the use of modern biotechnology and consequently the policy process and the form which regulation and policy eventually takes. Laws that have evolved at both the international level and national level are discussed here, as they are important in determining the issues that become central to the debate as well as how the policy process evolves. An outline of the institutions engaged in research and policy making is presented.

Development and Economic Context for Agriculture

Zimbabwe's economic development path is the product of, on the one hand, formal planning processes, such as the adoption of development plans and, on the other, responses to crisis, unplanned government activities and over expenditure by the state.

The formal planning process includes a series of development plans. These include a long-term plan known as Vision 2020, a medium term plan called Zimbabwe Programme for Economic and Social Transformation (ZIMPREST) and short-term plans.¹ Recently the Millennium Economic Recovery Plan has been adopted. Prior to this there was a system of five-year national development plans. The government sees ZIMPREST as a strategy that builds on the Economic Structural Adjustment Programme (ESAP) and redresses some of its shortfalls. ZIMPREST was adopted in February 1998.

There are several key elements in the development path. Firstly, there is a move towards a liberalised economy. This was (and is) seen as critical because economic performance is dependent on the ability to earn foreign currency, for debt servicing and imports. Economic reform measures introduced under ESAP included deregulation, the removal of price and labour controls, the downsizing of government in a bid to reduce the budget deficit, the promotion of exports and the reform of public enterprises. Although ESAP has been disbanded government policy is still geared towards reducing its own expenditure. The Millennium Economic Recovery Programme placed a ceiling on the public service salary and wage bill, this was set at 12% of GDP. The Ministry of Finance announced in the 2000 Budget that a Public Finance Management System was established to control government expenditure. Secondly, a key focus of economic and development policy has been improving the welfare of the rural and urban poor. ESAP failed miserably in this area. It had been hoped that ESAP would guide the economy towards self-sustained growth and that the benefits of such

¹ Neither the long term or short term plans are publicly available

growth would trickle down through the market and help alleviate poverty as well as increase economic opportunities for the majority of people. The reality, however, was that ESAP resulted in reduced social spending in health, education, nutrition and employment. Inflation began to soar rapidly under ESAP and has continued to do so. Inflation for the year to 2000 averaged at 60%. This can be attributed in part to the decontrolling of prices in the context of a not fully developed market economy. Thus in the face of inadequate competition prices have soared. Under ESAP poverty was exacerbated and real incomes fell dramatically. The government believed that its failure to create positive social spin-offs is linked to a failure in redressing the fundamental social and economic inequalities originating from the colonial experience. The distribution of and access to resources, including finance natural resources and land was seen as key.

Given this failure the government has revisited the issue of social development – and has consequently adopted ZIMPREST. ZIMPREST objective is to bring about an adequate and sustainable rate of economic growth and social development to reduce poverty and improve livelihoods for this and future generations. The key focuses of ZIMPREST are generating economic growth, employment creation, entrepreneurial development, economic empowerment and sustainable poverty alleviation. Given the limited size of the domestic market the policy focuses on 'efficiency gains and output expansion' through the further integration of Zimbabwe into the regional and global economy. In this respect it seeks to reduce trade barriers to ensure Zimbabwe benefits from global trade. Also identified as key is investment in human skills development to improve productivity and to acquire a meaningful stake

in economic development. Under ZIMPREST access of smallholder farmers to technology, information, finance and infrastructure facilitated.

The Poverty Alleviation Action Plan suggests that, in the context of ESAP and the persisting economic climate, urban to rural migration has increased as poor people struggle to make ends meet. In this context there was, and is, an ever-increasing dependence on agriculture and other natural resource use. The high costs associated with agriculture have meant that, in terms of local opportunities, the only effective way to increase agricultural output is through land expansion. This is exacerbated by the fact that in the communal areas there has been a loss in services including subsidised agricultural inputs. In the commercial areas economic structural adjustment has had positive spin-offs with the removal of restrictions on foreign currency, import licenses and import duties.

The agricultural policy has evolved in this context of increased poverty, ever-increasing demand for foreign currency and the need for food self-sufficiency. Also important has been agriculture's role as a key employer. The agricultural sector has also been plagued by problems of climate, such as droughts and floods. In particular the droughts of 1992 and 1994-5 were particularly devastating. As the value of the Zimbabwean dollar has fallen there has been increased pilfering of foreign currency by the private sector. In the last 18 months difficulties have been compounded by a political climate that has alienated key donors and investors and has made threatened the tenurial security of large-scale commercial farms.

Two key trends are evident in government's agricultural policy; these are a drive to improve productivity and to a land resettlement programme designed to redress problems of racial inequality in access to land. The stated objective of Zimbabwe's Agricultural Policy Framework 1995-2020, is to 'increase agricultural production at a substantially faster rate than has prevailed over the past decade (Government of Zimbabwe (GOZ), iv) and to 'optimise productivity. Substantially increased farm output, it is argued, is critical for food security, food security at national and household level, a greater contribution to regional food supplies improved earnings in real terms of the farming population, greater foreign currency earnings, and additional supplies of raw material for the industrial sector and. It is noted that given the limited resources they must be used to generate maximum returns. From a crop and livestock perspective this is understood to require an increase in the average yields for maize, small grains, sunflowers, groundnuts and cotton. Government seeks to double current yields. Low yields are seen to be a product of many factors including uneven and racially skewed land distribution, under utilised commercial farms, poor agro-ecological zones (soil fertility, drought), lack of access to irrigation, limited production season, costly essential inputs and infrastructural development and labour intensive management. The lack of improved seed varieties, for some crops e.g. groundnuts, is identified as a major constraint. The approach of government is to address each of these constraints through land reform, increased support for small farmers and research.

The land resettlement programme was allocated \$1.3 billion, representing 13% of the budget. A revolving fund for small and medium enterprise and indigenisation was allocated \$1 billion. Ironically

government's attempts to address issues of equity in access to land and to create new economic opportunities have exacerbated the financial crisis and the perceived insecurity of the private sector.

The government notes that realisation of these objectives requires a commitment to research and development activities. Two objectives of agricultural research and technology development identified in the policy are to (p74):

- promote sustainable agricultural production systems with minimal environmental impact
- to increase economic returns from cash crops through cultivar selection, soil management and irrigation methods, crop protection and post harvesting technologies.

As will be seen in the section on institutions, given the financial and donor crisis, investment in agricultural research is very small. Other identified problems and constraints to effective research, include inadequate linkages between farmers, extension workers, manufacturers of inputs and products and financiers. This has undermined the effective development of strategic plans and the setting of priorities. A key future strategy is the development of participatory approaches in determining research priorities. Notwithstanding this realisation, the strategy implicit in the policy is to 'encourage' farmers in marginal rainfall areas...to grow drought tolerant crops particularly cotton, small grains and sunflowers'. It appears that this will be done primarily through the agricultural extension service. The role or value of biotechnology in developing or improving such crops is not considered in the policy.

Priority Crops

The identification of 'priority crops' is important when addressing the problems of food security and informs research choices and the allocation of resources.

The agricultural policy identifies the need for support for the most ecologically marginal areas and consequently identifies high priority crops as those that are drought resistant. NGOs, private companies and universities also recognise a need to identify crops that are able to respond to local conditions and contribute towards agriculture meeting its objective.

A national priority setting exercise identifying priority crops was undertaken in 1993 by a local NGO, Environment and Development Activities (ENDA) on behalf of the Netherlands' Directorate General International Co-operation (DGIS) Biotechnology Programme. This initiative has identified the following research priority areas: mushroom propagation, livestock feed fermentation, biological nitrogen fixation for production of legumes, sweet potato micro-propagation² and maize improvement for pest resistance and drought tolerance.³

A national symposium on the 'Current status of Biotechnology Research and Applications in Zimbabwe' co-hosted by the Biosafety Board and BTZ identified the following research priorities in agriculture:⁴

- Genetic Engineering: sweet potato cultivars resistant to viruses and other pests; BT technology for maize, cotton and

² In collaboration with the University of Zimbabwe

³ Biotechnology, volume 5, 2, p3.

⁴ Biotechnology, volume 5, p1.

tomato; disease- and stress tolerance; nutritional crops e.g. quality protein maize.

- Marker- assisted selection: need to expand the marker assisted breeding programme to crops other than maize; need to use technology in other crops for other traits – e.g. high oil yielding ground nut
- BNF technology – need to further develop this technology with emphasis on indigenous legumes
- Tissue culture – expansion of the mushroom production programme. Further screen of indigenous and exotic varieties; sustainability studies; production of enzymes; disease free materials for sweet potato, sugar cane and other horticultural crops that have value for the small holder farming sector.

Science and Technology Policy

Science and technology are widely seen as being the basis for sound management of resources and for development. Consequently investment in education has been a key focus of the Mugabe government's policy since it obtained power upon independence from Britain in 1980. It has made remarkable achievements in this area. Investment in education is seen as essential for development.

Zimbabwe has one of the highest literacy rates in the region.

Investment in education has not only being at the primary level but also at the secondary and tertiary level. Since independence in 1980 several universities have been established including the National University of Science and Technology. The education sector gets a significant percentage of the national budget. Most state natural resource, agricultural and land management institutions have specialised research

stations that address issues of management and crop improvement. These stations have been used to support the private sector in areas of forestry, veterinary health and crop quality. They have also being key in providing support to poor farmers and communal areas inhabitants through specialist extension services.

Overall responsibility for science and technology falls under the Research Council of Zimbabwe (RCZ). It has an advisory role in areas of science and technology and consequently co-ordinates and monitors research and development (R&D) activities. It is authorised to establish sectoral research councils and boards and with Government approval, R & D centres. This mandate has enabled the RCZ to establish the Scientific and Industrial Research and Development Centre (SIRDC) in 1992. The Biotechnology Research Institute (BRI) is one of eight specialist institutes falling under its authority. Their research focus is discussed under the section on institutions.

The Ministry of Higher Education is currently engaged in developing a policy on Science and Technology. It is still not publicly available.

Environmental Policy and Law

Law and Policy, at both the national and international level, influence the development of biotechnology policy by bringing certain issues to the fore. In some instances law may actually place constraints on biotechnology policy. Depending on its status, international law may either establish a guide for practice or a legally binding rule. International law only forms part of the law of Zimbabwe in so far as it has been incorporated into national law,⁵ the mere signing and

⁵ Section 111B of the Constitution

ratification of conventions do not make them law. Nevertheless it creates a persuasive basis for practice and law development.

A key focus of environmental policy in Zimbabwe, and perhaps law, is to minimise negative impacts on bio-diversity and ensure sustainability and genetic diversity. An equally crucial focus has been the control of access to genetic resources and plant resources-related knowledge (PRRK) and the right of Zimbabweans to derive benefits from their use. The prioritisation of these issues parallels developments within the global arena and in particular the adoption of the CBD, the Rio Declaration and Agenda 21 in 1993 and the debate around intellectual property rights.

Key policy initiatives at the national level include the initiation of a process to adopt an environmental management act based on the principle of sustainability, the adoption of the Bio-diversity Strategy and Action Plan (BSAP) in 1998 and the implementation of an environmental impact assessment policy. The BSAP establishes the basis for the implementation of the Convention on Biological Diversity (CBD). It focuses on addressing 'unmet and priority' needs and in so doing identifies inadequate and weak areas in Zimbabwe's bio-diversity management regime.

Assessing Risk

The main policy dealing with controlling, preventing, and monitoring negative and potentially negative environmental impacts on biological diversity is the 1994 Environmental Impact Assessment (EIA) policy.⁶ The application of the policy is limited to 'prescribed activities'. These do not include research, agricultural trials or the release of transgenic seed

⁶ This is expected to become law when the draft Environmental Management Bill becomes law possibly in 2002.

and hence have no direct application. Nevertheless it maybe argued that the principles informing the conducting of EIAs should have been included in the Research (Bio-safety) Regulations. The approach of this policy has influenced thinking around issues of bio-safety and to some extent issues of inter ministerial co-operation and public participation in making decisions.

Since its adoption there has been an increased acceptance, amongst the private sector and the public, that activities that have negative impacts on the environment should be subject to an assessment before being allowed. Two key features of this assessment process should be noted. Firstly, although the policy recognises the need for public to participate where they are affected by a proposal and provides for public access to all formal EIA documentation, ultimate authority is clearly located in a specialist technical agency. The rights of participation are restricted to those with a 'legitimate interest'. No procedural mechanisms are created to ensure that the public opinions sought are actually incorporated into the decision-making process. Secondly, the criteria for making the decision to authorise the activity are not clear. The policy requires that due consideration is given to the effects of the development on the biophysical, socio-economic, historical and cultural environment. EIA goals include the conservation of the broad diversity of wild living resources and ecosystems, the preservation of natural processes and the minimisation of irreversible environmental damage and the protection of the social, historical and cultural values of people and their communities. Nevertheless there is no guidance on the relative weighting of these factor against development interests. Nor is there any indication of how costs are to be weighed against benefits. There are no clear guiding principles for decision making. The policy has shied away from all mention of the precautionary principle. This is possibly a result

of how at the global level the principle has been used to undercut sustainable wildlife management in Zimbabwe. Thirdly, the EIA process is seen not just as a prior evaluation but also as a system for project planning.

At the global level the precautionary principle has become an increasingly important tool in assessing risk, notwithstanding the fact that there is a wide range of possible obligations or interpretations of the principle. Its significance lies in addressing circumstances where there is scientific uncertainty about the impact of an activity. Perhaps what is most important is the shifting of responsibility for demonstrating safety. Where there is a significant risk then the obligation is shifted to the developer. As Hohmann suggests (1994,342) a consequence of this approach may well be the duty to establish systems of precautionary crisis management. This may include providing information in advance, early notification, consultation and contingency plans.

Maintenance of Genetic Diversity

An important focus in the BSAP is the preservation of genetic diversity. The valuation of bio-diversity to the national economy and to local communities is identified as an important activity which is required to better inform policy makers. It is increasingly recognised that this diversity must include agricultural crops and in particular their wild relatives given that the harsh and unstable climate and lack of investment does not support traditional agriculture. This is a key consideration for acceptability of genetically modified crops given concerns about their impact on biodiversity, essential natural processes and ecosystem integrity.

Access regimes for plant genetic resources

The issue of access to plant genetic resources and the resultant benefits from their use is a key issue for many stakeholders in the biotechnology field and the development of related policy.

National Law⁷

At a national level concerns have revolved around access to genetic resources and an inadequate intellectual property rights (IPR) regime to protect the interests of communities and farmers and their plant resource related knowledge. Its importance has been identified in both the BSAP and the draft environmental management bill. The issue of IPRs is addressed in a wide range of national legislation, international law and policy.

In the BSAP the creation of comprehensive bio-diversity and indigenous knowledge inventories and monitoring programmes is seen as a priority in order to achieve a meaningful level of control over knowledge and genetic resources. The purpose of such control is to limit opportunities for biopiracy and to ensure local benefits accrue from conservation efforts. Thus the BSAP recognises that this can not simply be a top-down initiative but must involve the participation of local communities and traditional leaders. This trend, to controlling access to genetic resources, has also found expression in the draft Environmental Management.⁸

⁷ Since this paper was written new legislation establishing an Intellectual Property Tribunal has been adopted. [Chapter 26:08]. The Plant Breeders Rights Act and the Trade Marks Act have been amended by respectively by Act 11/2001 and Act 10/2001.

⁸ It provides that 'The Minister, may monitor access by any person to the genetic resources of Zimbabwe and may recommend to the responsible Minister—

(a) measures for the exportation of germ plasma;
(b) measures for the sharing of benefits arising from the technological exploitation of germ plasma originating from Zimbabwe between the owner of the technology and the Government'.

Zimbabwe's intellectual property rights legislation⁹ currently recognises patents, trademarks,¹⁰ industrial designs,¹¹ copyright,¹² trade secrets¹³ and plant breeders rights. Directly relevant to the debate on biotechnology are patents and plant breeders' rights.

For an invention to be patentable, it must be new, involve an 'inventive step' i.e. it must be non-obvious and it must be capable of industrial application. A patent is a legally enforceable right of an inventor for a fixed period of time, to exclude persons from manufacturing, using or selling a patented product or from utilising a patented method for process. At expiration the patented invention falls into the public domain. Plant breeders' rights pertain to plant varieties that are sufficiently homogenous and stable. The breeders' protection extends only to the production of reproductive material for purposes of commercial marketing (as distinct from the use of the protected variety as an initial source of creating varieties) and to the use of the registered name for selling any other variety within the same class.

Zimbabwe also has a system of plant variety protection. The principle act is the Plant Breeders Rights Act passed in 1973 but came into effect in 1974. It was then modified in 1979. The purpose of the Act is to provide for the registration of plant breeders' rights in respect of certain varieties of plants and the protection of the rights of persons who are registered as the holders of such rights. Only plants that originate in

⁹ This is currently under review to ensure compliance with WTO TRIPS

¹⁰ A trade mark is a sign which distinguishes the product of one enterprise from the products of other enterprises. Registration of a trade mark establishes an enforceable right to exclusive use of that mark.

¹¹ An industrial design establishes rights on the ornamental or aesthetic aspect of a useful article. It must be novel and capable of reproduction by industrial means.

¹² Copyright establishes rights in original literary, artistic, audio-visual, photographic, architectural, paintings, dramatic and sculptural works.

¹³ Trade secrets are recognised by customary law and the common law. Once revealed the trade secret it loses its protection, unless it can be shown that the information was unlawfully obtained.

Zimbabwe are eligible for protection under the Plant Breeders Act. Such plant must be new in that they not have been available to the public, in trade or otherwise prior to application, or generally known.¹⁴ It must have at least one distinctive characteristic, and be uniform and stable.¹⁵ The Act seeks to reconcile the interests of the breeder and other breeders, while it recognises the intellectual rights of the breeder it does not impinge on public use. Once the process of registration has begun the applicant is entitled to exclusive commercial rights until the application is accepted or rejected,¹⁶ other breeders however are entitled to use the plant as the basis for further development and breeding. If the application is granted then these rights subsist for a period of 20 years; a breeder can apply for a five-year extension. This level of protection is unlikely to be seen as sufficient by developers of GM crops.

The Seeds Act does not as such confer property rights on seed distributors; however it controls the distribution of seed. No person is entitled to sell seed unless they are registered as a seller of seed or test seed other than in a laboratory registered as a seed-testing laboratory.¹⁷ This does not apply to the sale of seed, which is grown by any farmer and sold by him for use as seed.

There are a number of international legal agreements that are pertinent to the issue of access to genetic resources and intellectual property rights. These include the Convention on Biological Diversity, the FAO International Undertaking and the TRIPS agreement of the WTO¹⁸ and

¹⁴ Section 3(1)(a) and (b)

¹⁵ Section 3(1)(c), (d) and (e)

¹⁶ Section 12(1) and (2)

¹⁷ Section 8

¹⁸ Zimbabwe is party and taking legislative steps to be fully compliant.

UPOV. Important principles that can be extracted from this legal framework include national sovereignty over genetic resources, a commitment to protect private innovations, an obligation to share the benefits arising from the use of such resources. Some agreements recognise community and or farmer rights.

International law provisions governing access

The CBD is a framework agreement setting out principles for access to genetic resources. The Commission on Plant Genetic Resources¹⁹ has developed two international agreements relevant to the biosafety protocol and to CBD. The International Undertaking on Plant Genetic Resources, was adopted by the FAO Conference in 1983,²⁰ to promote international harmony in matters regarding access to plant genetic resources for food and agriculture. The International Code of Conduct for Plant Germplasm Collecting and Transfer was adopted by the FAO Conference in 1993.²¹

The CBD only applies to collections that have been acquired since it has entered into force. Other collections are governed by the FAO's International Undertaking. In 1993 the FAO adopted the International Code of Conduct for Plant Germplasm Collecting and Transfer. Certain key principles emerge from this legal regime these include national sovereignty and benefit sharing. The CBD firmly establishes national sovereignty as the basis for access to genetic resources.²² Such

¹⁹ Established by the FAO Conference in 1983. The mandate of the Commission was broadened to include all genetic resources that pertain to food and agriculture in 1995. The current Membership of the Commission on Genetic Resources for Food and Agriculture is 158 countries and the European Community. Zimbabwe is a member.

²⁰ There are 113 countries, including Zimbabwe, that have adhered to the Undertaking. The revision of the Undertaking in harmony with the Convention on Biological Diversity is currently being negotiated by countries through the Commission.

²¹ This has subsequently been incorporated into the Protocol on Biosafety.

²² This is consistent with the position set out in the FAO (legally non-binding) *International Undertaking on Plant Genetic Resources* Article 12 as amended by Resolutions 4/89 and 3/91

sovereign right must be exercised in accordance with the Charter of the United Nations and the principles of international law. The right of states to exploit their own resources does not affect their 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 their national jurisdiction or justify the violation of individual rights.²³ Sovereignty implies the right to set rules on how to deal with such resources, not only for their own citizens but also for foreigners performing activities in the country. It does not however amount to ownership. Ownership may be held individuals or by groups of individuals. Ownership rights might be rights to tangible or intellectual assets. Consequently an access regime will have to take these rights into account and consider the interface between the sovereignty and ownership.

The CBD creates a framework for the granting of access rights to genetic resources that takes into consideration a number of cross cutting issues. It places an obligation on Parties to conserve biological diversity while ensuring the sustainable use of its components and the fair and equitable sharing of benefits arising from the utilisation of genetic resources. This includes 'appropriate' access to genetic resources and by 'appropriate' transfer of relevant technologies, taking into account all rights over those resources and to technologies.²⁴ The agreement seeks to reconcile the conflicting interests of resource rich countries and technology rich countries in such a manner as to promote the conservation of biological resources. Access is based on the recognition of the sovereign right of states to make access conditional. Although parties agree to create conditions to facilitate access for

²³ Flitner and Musendo (1998)

²⁴ Article 1

environmentally sound purposes²⁵ access maybe conditional. Similarly the FAO Code of Conduct on Germplasm emphasises that access to plant genetic resources should not be unduly restricted. The CBD also requires Parties to take all 'practicable measures to promote and advance priority access on a fair and equitable basis by contracting parties, especially in developing countries, to the results and benefits arising from biotechnology based upon the genetic resources provided by such parties.'²⁶

The CBD provides that access to genetic resources must be on mutually agreed terms and based on prior informed consent.²⁷ Countries may define criteria/ rules that restrict access to biological resources by making it conditional on the sharing of benefits. Access is based on the notion of sovereign equality and must be on 'mutually agreed terms' and on the prior informed consent (PIC) of the country providing resources. Such access is directly linked to the creation of fair and most favourable access and transfer of technologies including biotechnology. Each Party is called on to take measures 'with the aim of sharing in a fair and equitable way the results of research and development and benefits arising from the commercial and other utilisation of genetic resources with the contracting Party providing such resources'.²⁸

The Protection of IPRs

Despite the trade-off made between access to genetic resources and access to technology the CBD provides that transfer of and access to technology shall be provided on terms, which recognise and are

²⁵ Article 15 paragraph 2

²⁶ Article 19 paragraph 2

²⁷ Article 15 paragraphs 4 and 5

²⁸ Article 15 paragraphs 7

consistent with the adequate and effective protection of IPRs.²⁹ Each contracting party commits to creating a framework for access by other parties to technologies protected by patent or other IPR as is consistent with international law. Protection as a patent may allow for public disclosure of information sufficient to reproduce the invention, but give the patent holder the exclusive right to control commercial use of the invention for a limited period. Other forms of protection may be much stricter. Trade secrets, which are classified as IPR, under the TRIPS Agreements, give the holder the right to prevent the acquisition and use of information, where the information has commercial value because it is secret, and holder has taken reasonable steps to keep it confidential.

The Agreement on Trade Related aspects of Intellectual Property Rights (TRIPS) of the World Trade Organisation establishes a global system for intellectual property rights.³⁰ It establishes minimum standards for protecting intellectual property rights through patents, copyrights, geographical indications, industrial designs, trademarks and trade secrets. Article 27.3 (b) allows parties to elect to exclude plant varieties and essential biological processes from patentability. In this case they must establish a *sui generis* system for the protection of plant varieties instead. It further requires that such system should not discriminate on the basis of nationality. As will be seen later, in an effort to protect local community interests and ensure that benefits accrue locally, there has been a longstanding effort to build a national consensus that sets the basis for *sui generis* legislation.

TRIPS, however, fails to protect the proprietorship of local communities or farmers. This may be inconsistent with the CBD which calls on parties

²⁹ Article 16 paragraph 2

³⁰ Zimbabwe is party to this Agreement

to 'respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional life styles...'³¹ Significantly however the issue of indigenous and local community rights are addressed in a number of important international agreements. These include the FAO International Undertaking on Plant Genetic Resources (IUPGR).³² The CGIAR institutions have also established basic agreements for access.³³ Farmers' rights are more widely recognised than community rights within international law; although there is also a clear legal basis at the international level for recognising community rights.

Farmers' Rights under the IU are not IPR capable of individual control, instead they are:

'rights arising from the past, present and future contributions of farmers in conserving, improving and making available plant genetic resources, particularly those in the centres of origin/diversity. These rights are vested in the International Community as trustee for present and future generations of farmers in order to ensure full benefits for farmers, and supporting the continuation of their contributions as well as the attainment of the overall purposes of the International Undertaking'.³⁴

³¹ Article 8j

³² Resolution 5/89

³³ In 1994, FAO negotiated a model agreement with the Consultative Group on International Agricultural Research (CGIAR) placing the international collections of plant germplasm maintained at the CGIAR Centres under the auspices of FAO. The agreements have been concluded between FAO and all the CGIAR Centres holding plant genetic resources. The CGIAR has agreed that it holds these resources in trust for the benefit of the international community and shall not claim legal ownership over the germplasm or apply any form of IPR to the material itself or related information. No provision is made for the sharing of benefits arising out of the use of the germplasm.

³⁴ FAO Resolution 5/89

Although new approaches to farmer and community rights are based on this kind of understanding, they have been further developed on the basis of human rights law and the emerging approach to community as evidenced in the UNCED agreements. Additionally with respect to local farming communities embodying traditional livelihood systems, these rights may be strengthened by traditional resource rights. Human rights law recognises the right of all to 'freely dispose of their natural wealth and resources without prejudice to any obligations arising out of international economic co-operation.... In no case may a people be deprived of its own means of subsistence'.³⁵ International law also recognises the rights of all 'to benefit from the protection of the moral and material interests resulting from any scientific literary or artistic production of which he is the author'.³⁶

The OAU model legislation³⁷ uses this kind of approach to Farmers' Rights. Farmers' rights 'are recognised as stemming from the enormous contributions that local farming communities ... have made in the conservation, development and sustainable use of plant and animal genetic resources that constitute the basis of breeding for food and agriculture production'.³⁸ Consequently, it is stated, for farmers to continue making these achievements, their rights have to be recognised and protected. The model legislation states in Article 26 that farmers' varieties are recognised and shall be protected under the rules of practice as found in, and recognised by, the customary practices and laws of the concerned local farming communities, whether such laws are

³⁵ Article 1(2) of ICESCR and ICCPR

³⁶ Article 15(1)(c) of ICESCR

³⁷ African Model Legislation for the Protection of the Rights of Local Communities, Farmers and Breeders and for the regulation of access to Biological Diversity to guide its members in developing nation *sui generis* systems for the protection of plant varieties. An NGO initiative IUCN ROSA, FAO Links and Commutech have developed further guidelines for model legislation.

³⁸ Article 25

written or not. Further, it's provided that farmers' rights shall include the protection of traditional knowledge relevant to plant and animal genetic resources. It entitles farmers to an equitable share of benefits arising from the use of plant and animal genetic resources; the right to participate in making decisions, including at the national level, on matters related to the conservation and sustainable use of plant and animal genetic resources. Farmers are also entitled to save, use, exchange and sell farm-saved seed/propagating material and to use a breeders' variety protected under law to develop farmers' varieties. However, the farmer is not entitled to sell farm-saved seed/propagating material of a breeders' protected variety in the seed industry on a commercial scale.

UPOV³⁹ defines the general international regime for protecting plant varieties and breeders' rights. Broadly protection is confined to reproduction and commercial use of the protected variety for a period of time while not denying the right to use the plant as a basis for further breeding. The OAU model legislation proposes that Plant Breeders' Rights at the national level be limited by the right of any other person to propagate, grow and use plants of that variety for purposes other than commerce. Nevertheless, such person may sell the plants as food or for another use that does not involve the propagation of that variety. The plant may also be used as the initial source for the breeding of a new variety or for research or teaching.

Farmers' rights are closely related to the rights of local communities. Traditional resource rights (TRR) set the basis for the protection of community interest and rights in genetic resources. TRR encompass

³⁹ There are two functional versions of this the 1978 version and the 1991 version. Zimbabwe has begun the accession process to the 1978 version.

respect for social and cultural identity and rights to resources⁴⁰ including land and in particular ancestral lands, security of livelihood,⁴¹ intellectual and cultural property, and participation. It requires the recognition of a right of prior informed consent (PIC) and the obligation to avoid arbitrary discrimination, deprivation or other prejudicial actions. Tenure and livelihood rights set the legal basis for demanding the right of communities to regulate access to genetic resources, including plant varieties, situated on their land and territories. Additionally it requires the equitable sharing of benefits arising from traditional knowledge innovation and practices.

The Organisation of African Unity (OAU) has tried to develop a model that addresses in part the problems of representation and distribution of benefits. It states that:

'Rights of local communities over their biological resources, knowledge and technologies that represent the very nature of the livelihood systems and that have evolved over generations of human history, are of a collective nature and, therefore, are a *priori* rights which thus take precedence over rights based on private interests'.

It seeks to treat community rights as inalienable rights. It urges states, in their national legislation,⁴² to recognise the rights of communities over their biological resources and their innovations, practices, knowledge and technology acquired through generations. This includes the right to collectively benefit from the use of their biological resources

⁴⁰ Universal Declaration on Human Rights and the International Labour Organisation's Convention No 169

⁴¹ Article 10c CBD

⁴² Article 17

and the utilisation of their innovations, practices, knowledge and technologies.

Access to such biological resources, community knowledge and technologies are made subject to the prior informed consent of the State and the concerned local communities.⁴³ Access is based on agreement not to patent⁴⁴ and to share the benefits arising from such use.⁴⁵

Biosafety Law

The issue of biosafety is only partially dealt with through legislation. Although Zimbabwe has a number of Acts that deal with the issue of conservation of biological diversity none of these deal directly with the issue of biosafety. However, both the Seeds Act and Plant Breeders Act have provisions that are potentially relevant. The Environmental Impact Assessment Policy could also possibly be used to address this issue. A statutory instrument, the Research (Biosafety) Regulations,⁴⁶ adopted under the Research Act deals partly with this issue; its focus is on biosafety considerations arising from research and field testing of modified crops.

Interestingly the Plant Breeders Act allows the Registrar to refuse to register a plant on the grounds that 'the growing of the plant concerned would be contrary to the general interests of agriculture, forestry or horticulture in Zimbabwe'.⁴⁷ This could potentially be used to prevent the registration of modified species that are seen to undermine subsistence agriculture or pose a risk to other species through

⁴³ Articles 5, 12 and 19

⁴⁴ Article 8

⁴⁵ article 23

⁴⁶ Statutory Instrument 20 of 2000

⁴⁷ Section 10(d)

transgenics. The Seeds Act provides for the registration of sellers of seed and seed testing laboratories; it regulates the importation, exportation and sale of seed; and it provides for the testing, certification and inspection of seed. The Act does not apply to seed for food or stock feed or for industrial purposes.⁴⁸ The Seed Act also allows the Minister to establish systems for certification,⁴⁹ as well as regulate the packaging of seeds,⁵⁰ and the import and export of seed.⁵¹ Provision is made for the destruction of seeds, without compensation, that do not comply with the regulations. The Act gives the Minister the right to prohibit the production of seed for the purposes of sale; or the sale for the purposes of reproduction or multiplication and establishes a procedure for such prohibition.⁵²

The Research (Biosafety) Regulations, adopted under the Research Act, apply to techniques:⁵³

- in which recombinant DNA molecules or genetically modified organisms are employed in *in vitro* fertilisation in human beings and animals; or in conjunction, transduction, transformation or any other natural process or in polyploid induction
- in which genetically modified organisms as recipient or parental organisms are employed in mutagenesis; or the construction and use of somatic hybridoma cells; or cell fusion (including protoplast fusion) of plant cells.

⁴⁸ Section 11

⁴⁹ section 12

⁵⁰ Section 10

⁵¹ section 16

⁵² section 23

⁵³ section 3a

They also apply to any activities involving genetically modified organisms that are declared by the Council to constitute potentially harmful research or undertakings.

The regulations are implemented by a Biosafety Board, which consists of at least three, and not more than 15, members appointed by the Research Council. No criteria for appointment are set out in the regulations. The Board is composed primarily of scientists associated with the Research Council that initiated the development of the biosafety regulations. The general function of the Board is to advise the Research Council on all aspects concerning the development, production, use, application and release of genetically modified organisms. In particular it must ensure that all activities in this regard are performed in accordance with the regulations. Specifically the Board is responsible for developing a long-term policy for safety in biotechnology in Zimbabwe.⁵⁴ Nevertheless this is coupled with the obligation to promote biotechnology. It is also required to recommend a training programme for biosafety officers. The Board also has a wide, and possibly conflicting, range of functions including reviewing the use of GMOs,⁵⁵ monitoring and inspections,⁵⁶ granting authority to use,⁵⁷ advise,⁵⁸ disseminating information and networking,⁵⁹ and informing neighbouring

⁵⁴ This process has started but has not as yet been completed.

⁵⁵ This includes responsibility for reviewing reports of all ongoing approved projects and controlled experimental trials involving high risk category organisms; responsibility for reviewing projects and proposed projects involving high risk category organism. The Board is responsible for monitoring the discharge of GMO or cells or waste.

⁵⁶ Monitor and approve the discharge of GMO, cells or waste from labs and hospitals.; monitor compliance with the regulations

⁵⁷ to approve the deliberate release of GMOs and their large scale use in industrial production and application; an obligation to assist in the clearance of applications for setting up industries based on GMOs; approve the discharge of GMO or cells or waste; approve the safety aspects of import and export, manufacture, processing and selling of GMO (including substances, foodstuffs and additives containing products of genetic engineering

⁵⁸ Identify, prioritise and propose areas of standardisation, advise customs; and to advise the Council whether to approve, prohibit or restrict such trials.

⁵⁹ Collect and disseminate information pertaining to safety procedures, international contacts.

countries of accidents. The regulations establish the powers of the Board in regulating biosafety practices.⁶⁰

The Board, with the consent of RCZ, may issue binding biosafety guidelines and standards of practice and procedure for registered facilities. Guidelines may be issued in a wide range of issues including biosafety. Such safety standards may define the contents of risk assessments and environmental impact assessment; classify organisms based on risk; determine the level of risk at which prior approval of the Board is necessary; establish requirements pertaining to the use of GMOs and their release; establish effective waste management systems; and establish import, export and control measures to be complied with. A maximum fine of Z\$100 000 (US\$1700) or one year imprisonment or both may be imposed for violating the safeguards. Biosafety Guidelines have been adopted. These are discussed below.

The regulations make provision for the registration of facilities and permits. They require institutional biosafety committees to be established and housed in every institution engaged in genetic research. The function of such committee is to monitor the genetic work of the institution and to ensure compliance with the biosafety regulations, guidelines and standards. This will, to some extent, establish systems of self-monitoring although clear reporting systems will need to be established.

The regulations impose a duty of care on users of GMOs to ensure that appropriate measures are taken to prevent or minimise any foreseeable danger to persons, animals, plants or the environment arising from such use. Procedures for the notification of releases and accidents are

⁶⁰ Part III

established. However the issue of liability is not dealt with and hence the standard delictual rules will apply. No special provision is made for the disclosure of information or public rights to object.

Interestingly, the regulations recognise the issue of conflict of interest as important - and require board members to declare interest where a close relative is involved. It fails however to deal with other possible conflicts of interest. This is particularly important as a majority of board members are practising biotechnologists. The regulations protect the confidentiality of information acquired in the course of duty and prohibit disclosure other than in accordance with the law. However they do provide that some information should be disclosed to the public. This seems to be restricted to information about applicants and the genetically modified organism mentioned in the application, required measures for monitoring, procedures to be taken in the event of an accident and the evaluation of foreseeable impacts on people, animals and the environment generally. The Board may withhold this information where the applicant is in the process of registering any intellectual property right. The extent of information disclosed may be inadequate for the public to bring actions contesting the Board's decisions. In any event the restricted rules of *locus standi* make this difficult.

The Standards Association of Zimbabwe is currently involved in developing standards for the labelling of genetically modified food products.

Biosafety Guidelines

The Biosafety Guidelines are designed to be 'not too rigid' and seek to 'afford protection to individuals, the community and the environment by minimising potential hazards associated with new applications of rDNA

and by facilitating the beneficial utilisation of biotechnology'.⁶¹ They establish guidelines for containment facilities in the laboratory environment, biological containment, physical containment (4 levels) and intentional release.

The Guidelines provide for the classification of micro-organism on the basis of risk groups. The underlying assumption being that the risk of a GMO is no greater than the risk of the donor micro-organism. The level of risk is based on the pathogenicity of the agent, modes of transmission and the host range of the agent, availability of effective preventative treatments or curative medicines and whether the micro-organism is widely available in Zimbabwe. The guidelines also establish scientific considerations for risk assessment that focus on characteristics of the donor, recipient and modified organisms. Familiarity is a key component of risk assessment procedures. An expressed assumption is that genetically modified versions of well-known crop plants will, in most cases, be the same kind as those associated with the parent organism. Additionally, risk assessment is based on the characteristics of the organism, the introduced trait, the characteristics of intended use, the receiving environment and the interactions between these. Knowledge of all these aspects is identified as important. The guidelines identify scientific expertise alone as important in the assessment of risks. Impacts to be assessed are limited to human health, agricultural production, other organisms and the quality of the environment.

In respect of commercialised agricultural products to be released a three phased testing process is established – greenhouse phase, limited scale field controlled plots and large scale multiple field plots in various

⁶¹ Guidelines, page 2

geographical sites. Greenhouse procedures are based on whether or not the plants are pathogens.

At the international law level the Convention on Biological Diversity is the principle agreement establishing a framework for the conservation of biological diversity. It was signed by Zimbabwe in 1992 and ratified in 1994. It only forms part of the law of Zimbabwe in so far as it has been incorporated through legislation. Nevertheless this and other agreements are important as they define the basis for law reform and describe the commitment to law reform at the national level. The CBD places an obligation on Parties to conserve biological diversity subject to the recognition that developing countries have over-riding development interests. In this context it is incumbent on states to ensure that their activities do not undermine the sustainability of bio-diversity.⁶² The Cartagena Protocol on Biosafety of the CBD was adopted on 29 January 2000. It has not as yet entered into force. Zimbabwe is a signatory to the Protocol but has not ratified it. The Protocol seeks to protect biological diversity from the potential risks posed by living modified organisms⁶³ resulting from modern biotechnology particularly through the regulation and control of the transboundary movement of living modified organisms.⁶⁴ Although it recognises the principle of sovereignty of states it requires parties to ensure that the 'development, handling, transport, use, transfer and release of any living modified organism is undertaken in a manner that prevents or reduces the risks to biological diversity, taking also into account risks to human health'.⁶⁵

⁶² Consequently this should be a key focus of legislation on biotechnology as things currently stand this is not the case.

⁶³ living modified organisms' refers to any biological entity capable of transferring or replicating genetic material, including sterile organisms, viruses and viroids.

⁶⁴ It does not apply to pharmaceuticals intended for human use that are addressed by other relevant international agreements or organisations.

⁶⁵ Article 2.2

The Protocol establishes a procedure for ensuring that countries are provided with the information necessary to make informed decisions before agreeing to the import of such organisms into their territory. This includes those organisms intended for use as food or feed or for processing. 'Strict Advanced Informed Agreement' procedures⁶⁶ will apply to seeds, live-fish, and other LMOs that are to be intentionally introduced into the environment. The Protocol also establishes a Biosafety Clearing-House to facilitate the exchange of information on living modified organisms and to assist countries in the implementation of the Protocol. The aim of this is to ensure that recipient countries have both the opportunity and the capacity to assess risks involving the products of modern biotechnology.

It recognises the value of the 'precautionary approach' as defined in the CBD. The protocol provides that the lack of scientific evidence pertaining to impact shall not prevent a party from adopting an approach to avoid or minimise potential adverse effects. It is not just the basis for making decisions but also for reviewing decisions. This varies from the position in the TRIPS agreement of the WTO. Decisions under trade law require 'sufficient scientific evidence'. The Protocol and the WTO are to be mutually supportive; at the same time, the Protocol is not to affect the rights and obligations of governments under any existing international agreements. Parties may also take into account socio-economic factors including the value of biological diversity to local communities.

In terms of the Protocol, Parties undertake to promote public awareness education and participation concerning the safe transfer, handling and

⁶⁶ Article 7

use of LMOs. They agree to endeavour to provide education and access to information pertaining to the import of GMOs. However, consultation with the public is to be based on national laws.

The parties are, at its first meeting, to adopt a process for the elaboration of rules and procedures in the field of liability and redress for damage resulting from transboundary movement of living modified organisms. Provision is made for the treatment of confidential information.

Several international agreements address the issue of phytosanitary standards, which may have implications for biosafety. The FAO agreement, the International Plant Protection Convention, 1952 (IPPC) seeks 'to secure common and effective action to prevent the spread and introduction of pests of plants and plant products, and to promote appropriate measures for their control'. There are currently 106 governments that are contracting parties to the IPPC. Zimbabwe is not a party, however it is worth considering as it forms part of the general global framework for biosafety. This agreement overlaps with the Biosafety Protocol in so far as the impacts of LMOs on plant bio-diversity can be covered under 'injurious' or 'phytosanitary concern'. The WTO Agreement on the Application of Sanitary and Phytosanitary Measures (the SPS Agreement) changed the role of the Convention with respect to trade. The WTO Agreement on the Application of Sanitary and Phytosanitary Measures (SPS) applies to all measures that countries put in place to protect their human, animal and plant life or health, and which may directly or indirectly affect international trade. Similarly the TBT Agreement was developed principally for the purpose of ensuring that technical standards, and procedures for assessing the conformity of

those technical standards, as well as related regulations, do not create unnecessary obstacles to international trade.

The IPPC allows parties to take phytosanitary measures - any legislation, regulation or official procedure having the purpose to prevent the introduction and/or spread of pests. These cover the pest concerned and may also cover any plant, plant product, storage place, packaging, conveyance, container, soil and any other organism, object or material capable of harbouring or spreading pests that are deemed to require phytosanitary measures. Phytosanitary measures are to be based on a pest risk analysis, which covers both economic and environmental factors, including possible detrimental effects on natural vegetation. The Convention also allows for the prohibition or restriction of the movement of biological control agents and other organisms of phytosanitary concern into the territories of the parties. Any LMO that can be considered as a pest falls within the scope of the IPPC and will be subject to the provisions of the Convention. It is worth noting that the SPS Agreement of the WTO, is supportive of this, and states: 'To harmonise sanitary and phytosanitary measures on as wide a basis as possible, Members shall base their sanitary and phytosanitary measures on international standards, guidelines or recommendations, where they exist, except as otherwise provided for in this Agreement..'.⁶⁷

Food Standards

The Food and Food Standards Act regulates the sale, importation and manufacture of food; prohibits the sale, importation and manufacture for sale of food which is falsely described; and provides for the fixing of

⁶⁷ Article 3.1

standards relating to food and matters incidental thereto. Its administration is assigned to the Ministry of Health.

No direct mention is made of GMO foods, however, it is possible that GMO foods could be considered to be adulterated and thus controlled in terms of the Act.

Adulterated food may not be sold, imported or manufactured.⁶⁸ Food is deemed to be adulterated if it contains, or is mixed or diluted with, any substance or ingredient not present when the food is in a pure or normal state and in a sound condition. Adulterated food includes food that has been subjected to any process or treatment, which injuriously affects its nature, substance or quality or any of its other properties. It also includes food that fails to comply with any prescribed standards. Food is considered to be falsely described if it or its package bears any description which is incorrect or misleading in regard to its nature, substance, quality, composition (its nutritive or any other property), its origin, age, mode of or place of production, preparation or manufacture; or it is sold in substitution for another food and the purchaser is not informed prior to or on delivery of the substitution; or it or its package is not labelled in such manner and with such particulars as may be prescribed. It is an offence to sell such food products.

Further the Minister may adopt regulations that provide standards for the declaration of the composition of foods. Regulations may provide for the mode of labelling food or packages containing the same and provide for the control and regulation of advertisements relating to any food and, in particular, the prohibition of any such advertisement which is false or misleading.

⁶⁸ Section 5

Interestingly the Biosafety Board has not opted to liaise with the Ministry of Health and develop appropriate legally binding standards for GM foods. Instead it has approached the Standards Association of Zimbabwe (SAZ) to develop a food label standard for GMO foodstuffs. SAZ standards are not legally binding.

At the international level the Codex Alimentarius Commission (CAC), formed by FAO and the World Health Organisation in 1962 to implement the Joint FAO/WHO Food Standards Programme, is directly relevant. The objectives of the Programme are to ensure healthy and fair practices in the food trade. The CAC is an intergovernmental statutory body of FAO and WHO. Its current membership is 162 countries. The scope of Codex Standards includes all food safety considerations, description of essential food hygiene and quality characteristics, labelling, methods of analysis and sampling, and systems for inspection and certification. Codex Standards, guidelines and recommendations are based on current scientific knowledge including assessments of risk to human health. FAO/WHO expert panels of independent scientists who are selected on a world-wide basis carry out the risk assessments. The range of standards developed by the CAC covers all foods whether processed, semi-processed or raw, intended for sale to the consumer or for intermediate processing. Over 200 standards, 45 Codes of Practice and 2,000 Maximum Limits for residues of agricultural and veterinary chemicals have been established.

Codex standards, guidelines and other recommendations are not binding on member states, but are a point of reference in international law (General Assembly Resolution 39/248; Agreement on the Application of

Sanitary and Phytosanitary Measures; Agreement on Technical Barriers to Trade). The CAC is considering the development of a general standard, which would apply basic food safety and food control disciplines to foods derived from biotechnology (FAO website). Foremost among these are considerations of potential allergenicity, possible gene transfer from LMOs, pathogenicity deriving from the organism used, nutritional considerations and labelling.

Its Ad Hoc Intergovernmental Task Force on Foods Derived from Biotechnology has made significant progress in setting standards for foods derived from biotechnology.⁶⁹ The Task Force,⁷⁰ reached near consensus on a draft text of "general principles for risk analysis of foods derived from biotechnology". Risk analysis is the system by which governments consider the safety of foods and the measures that need to be taken to protect the public from any health risks. The guidelines do not cover environmental issues because these are included in other United Nations agreements, such as the Cartagena Protocol on Biosafety. The one point on which consensus could not be achieved was the question of traceability. This is a system of tracing all foods and food components from their origin to the point of final consumption and is not related exclusively to foods derived from biotechnology. According to the announcement, traceability is strongly favoured by European countries, but some countries worry that the system might be too complex and too costly to operate globally.

The Task Force also announced agreement on a Draft Guideline for the Conduct of Safety Assessments of Foods Derived from Recombinant-

⁶⁹ Press Release – 2 April 2001

⁷⁰ The Task Force, brings together officials from 35 countries and representatives of 24 non-governmental organisations including Consumers International, industry groups and Greenpeace

DNA Plants. The guidelines pay special attention to the question of allergenicity that might be transferred to new genetically modified (GM) plant varieties. The guidelines also prohibit the transfer of genes that would cause gluten-sensitive reactions in people with celiac disease. The Task Force will further refine guidelines at its next meeting and will initiate work on similar guidelines for the safety assessment of genetically modified micro-organisms used in food production and processing.

Research Institutions and technical capacity⁷¹

There are number of research institutions involved in the development of agricultural technologies. These include both public and private institutions. The majority of researchers use traditional biotechnology processes only a few are engaged in modern biotechnology techniques.⁷²The leading institutions in modern biotechnology in Zimbabwe are the University of Zimbabwe, BRI of SIRDC, the Tobacco Research Board, and CIMMYT.⁷³

In the research sector several state agencies are engaged in the development of biotechnology. These institutions include the Biotechnology Research Institute, the Department of Research and Specialist Services (DR&SS) of the Ministry of Agriculture and the Forestry Commission. Numerous agricultural and forestry research station specialise in the development of specific crops.

⁷¹ This section is based on interviews with key researchers at UZ and the tobacco institute. We have also drawn extensively on the ITDG study on Biotechnology in Zimbabwe

⁷² The ITDG study estimates that 70% of researchers are engaged in traditional biotechnology and that only 30% use more advanced techniques.

⁷³ ITDG, 13

BRI's research and development programme includes micro propagation of sweet potatoes, maize improvement for drought tolerance, development of crops with insect and bacterial resistance, production of transgenic crop varieties⁷⁴ and biosafety.⁷⁵ They are currently involved (in collaboration with KARI and a local NGO, BTZ) in developing maize with improved drought tolerance and insect resistance using molecular marker assisted breeding. Four Zimbabwe scientists have been trained at CIMMYT Mexico.⁷⁶

The University of Zimbabwe (UZ) through the departments of Crop Science, Biochemistry and Biotechnology and Animal Science is engaged in tissue culture micro-propagation,⁷⁷ Bt toxins, nitrogen and fertility studies, industrial production processes, improved reproductive efficiency of smallholder dairy cattle and ruminants. Researchers at UZ are engaged in producing disease free material, including sweet potatoes, cassava, strawberries, potatoes and coffee.⁷⁸

DR&SS although active in agricultural research is not currently undertaking work in advanced biotechnology. The Cotton Research Institute and the Crop Breeding Institute both have an interest in BT toxins. The Cotton Research Institute has shown keen interests to undertake some research work with Monsanto on BT- based insect resistance. A seed company, QUTON, owned by the institute has apparently entered into agreements with Deltapine and Monsanto to have exclusive rights to test, develop and market their biotechnology products in Zimbabwe.⁷⁹

⁷⁴ Due to funding constraints no work has been done in this area yet.

⁷⁵ ITDG, 16

⁷⁶ Biotechnology

⁷⁷ Primarily for disease control

⁷⁸ ITDG, 13

⁷⁹ ITDG, 16

The Tobacco Research Board has the best-equipped biotechnology laboratory in Zimbabwe. It is engaged in tobacco modification with genes carrying resistance to various diseases including the herbicide bromoxynil, riosome in-activating protein gene, and wildfire.⁸⁰ It began field-testing of genetically transformed plants, by a ttr gene, in 1993-94.

CIMMYT's biotechnology work in Zimbabwe focuses on the development and distribution of high yielding maize with genetic resistance to grey leaf spot, streak virus, leaf blight and common rust; improvement of insect resistance of maize varieties, and the conservation of genetic resources.

Several private companies are engaged in agricultural research and development. SEEDCO, Pannar and Cargill are involved in traditional breeding programmes. However Monsanto has acquired an interest in both SEEDCO and Pannar and this lays the basis for transgenic work. Pioneer Overseas Corporation is engaged in breeding for stress tolerance and drought, disease and insect resistance. Unconfirmed reports indicate that it is involved in testing some of its transgenic maize in Mozambique, Malawi and Zambia.

The private sector and particular the seed industry have become increasingly important research players. Given the decreasing investment in public sector research, as a result of economic reforms and economic crisis, private seed companies are set to become more important. Many have their own research sections that are actively engaged in the improvement of seed. One key player is SEEDCO. It

⁸⁰ ITDG, 17

employs nine breeders and owns two Research Stations one in a good agro-ecological zone and the other in a poor agro-ecological zone. McCarter the director of SEEDCO argues that with appropriate marketing strategies it is now economically attractive for the private sector to invest in crop breeding focused on resource poor smallholder farmers. Other seed companies with a presence in Zimbabwe include Monsanto, Cargill, PANNAR and Pioneer.

Despite this growing research interest and capacity the research sector is still very small. An ITDG (2000) study notes that in 1989 there were only 5 people who held PhDs, 5 people with MSc's and 9 with BSc's in biotechnology by 1998 the number of PhDs had risen dramatically to 27, MSc's to 31 and BSc's to 23. ITDG (2000, 17) estimates that biotechnology research work represents only 0.04% of GDP and 5% of the agricultural research budget.

The University of Zimbabwe has not only a research role but also a skills development function and in this capacity offers a master course in biotechnology. This is being undertaken in collaboration with the Free University of Amsterdam (VUA). 41 students have completed the course. ZIMBAC's newsletter, Biotechnology, advertised an internet based biotechnology course in 1997. The course was run by Iowa State University and focused on molecular biology, genetic diseases, pharmaceutical products, agriculture and food, the human genome and Gene therapy.

Institutions with Policy Making Role

There is a wide cross-section of actors that influence the process of policy formulation, including the selection of 'policy gaps,' and the

context in which policies and regulations are adopted and/or developed. This mix of institutions includes those with a specific policy development mandate and others that influence the process indirectly. The relationships between different actors and their location in the biotechnology debate will affect how policy is developed. Particularly important here is the relationship between government authorities, civil society, the private sector and farmers.

At the ministerial level, the President's Office (through the RCZ) and the Ministries of Lands and Agriculture, Health, Environment and Tourism are all key players. The Ministry of Higher Education has a mandate to consider the development of higher education and technology. Other government institutions focus on impacts of biotechnology on human health and the environment these include the ministries responsible for environment and public health. The Ministry of Justice is responsible for the formulation of law. Key institutions located in the Ministry include the Law Development Commission and the Attorney General's Office. Parliament is ultimately the law making body and has final authority and responsibility for law development. Also important is a standard setting body, the Standards Association of Zimbabwe (SAZ). The SAZ is a statutory body. It has a relatively open procedure, which anybody can use, for developing voluntary standards. It is currently involved in developing standards for the labelling of GMO foods.

The empowering acts are highly centralised and do not require participatory or consultative methods. General authority is placed in a Minister and structures and systems for downward accountability are poorly developed. By and large this practice has continued even in the face of other non-governmental sectors increasingly asserting their

interest. The exception to this practice is the Ministry of Environment led process for developing an environmental management act. This participatory process was taken as the result of new global perspectives about participation, a growing vocal non-governmental sector and the failure of established practice to support sustainable natural resource use.

Boards advise many of these ministries. These boards are constituted essentially as expert boards. In so doing they remove key issues from public debate and their conclusions and/or decisions are put forward as factual or objective and thus become incontestable by an 'ignorant public'. No rights of access to this information exist. By and large no system exists for contesting the decisions of such boards. A case in point is the Biosafety Board – which is composed of 'people that know'. The attitude to public participation is captured in the words of a senior official of the RCZ: 'How can civil society bodies sit on a board like this ... when they assume an orange has been genetically modified because it is seedless'. In this way the issues of ethics and rights are removed from the debate and the decision-making process about what biotechnology products/ processes to approve. Issues of consumer rights, ethics, paths of development are effectively trivialised. Additionally debate about 'science' is removed from the public domain. There are few civil society groups that contest this approach.

The Ministries are organised essentially as equal parallel authorities each with a particular domain of authority; this seems to undermine collaboration. While in many areas this is unproblematic the sectoral approach undermines the development of comprehensive policy in cross cutting issues. For example agricultural R&D activities fall under the

Ministry of Agriculture, responsibility for biosafety at a global level lies with the Ministry of Environment and for biotechnology research with the Biosafety Board under the president's office. The desire to retain control over specific areas rather than develop integrated approaches may be linked to the desire or need to monopolise access to benefits such as funding, travel and improved stature.

Law too becomes a key means for alienating the public. In communicating legislative instruments broad and sweeping generalisations are made about content. Key approaches are sometimes hidden. For example the biosafety regulations are firmly based within the overall objective of promoting biotechnology yet the focus of communication around these regulations is on how 'they will protect society from negative impacts'. Also hidden is the fact that they are enforced by a group of experts with overlapping and conflicting statutory mandates.

International actors include donors and NGOs. Key donors have been the Dutch and Norwegians. Dutch support has been the mainstay of the development of public sector research, training, and biosafety regulation. Also important are international or foreign NGOs, these include FAO, CGIAR institutions such as CIMMYT, RAFI, GRAIN, FAO, IUCN (through its regional office) and the World Development Movement. All these institutions have established interests in the field of biotechnology. Through their projects (including internet based information systems) and the creation of 'funding opportunities' they help shape and define policy gaps and solutions. International law and policy processes also influence the debate – of repeated influence are the CBD, WTO, FAO soft law and the OAU. Other international and

regional organisations may also exert some influence through workshops, training, electronic information databases. For example, recently the United States based Global Biodiversity Institute in conjunction with the University of Botswana hosted the Southern African Regional Training Workshop on Biodiversity, Biotechnology and Law.

The key institution in the development of policy around biosafety is the Biosafety Board as they have legal authority in this area. A number of NGOs are important players in the policy field, however their roles and status vary considerably. Those with a resource poor farmer focus include COMMUTECH, SALRED, AFFOREST and ITDG. It is however difficult to establish the validity of the claim that they represent 'farmers interests'. The 'donor or broker' role of many of these NGOs calls into question the extent to which they represent farmers. Farmers may align themselves with particular initiatives or groups in order to gain access to resources. To a large extent it appears that farmers' (declared) opinions on biotechnology within these NGO projects seem to reflect the prior existing approach of the NGOs concerned. It is probably fair to conclude that the institutional setting at this stage excludes resource poor farmers. Other civil society institutions focus on human and consumer rights, these include the Consumer Council and ZIMRIGHTS. Some NGOs, including the Consumer Council and ITDG, have contested policy around biosafety. Recently (March 2001) the Biotechnology Association of Zimbabwe was formed by BTZ as a multi-stakeholder forum for debate and public education. Some NGOs have been able to carve out policy niches.

Courts are technically not law- or policy-making bodies but just interpreters of the law. The reality, however, is that in performing their

function they make interpretations of policy and law that further develop the law. Zimbabwe's courts will often draw upon decisions from the courts of other commonwealth countries. So for example the principle in the recent Canadian case between Monsanto and a farmer, finding that the farmer deliberately retained his canola crop, that been modified through cross-pollination with Monsanto transgenic canola, could be applied by a court in Zimbabwe. Recently (April 2001) an Act establishing a specialist IPR tribunal was adopted.

Policy and Law formulation Process

Law is an import defining factor for policy development, firstly in that it defines procedures and sets standards for law and policy making and secondly because it makes substantive provisions in areas directly relevant to biotechnology. These substantive provisions have been discussed above. The legal framework for policy-making includes not only national law but also international law.

There is no overall legal framework created for policy development. The Constitution, which sets out the fundamental rights of citizens and the responsibilities of different organs of state, does not establish any principles dealing with administrative justice, accountability or transparency. There is no subsidiary legislation that specifically sets minimum standards and processes for policy development in Zimbabwe. Nevertheless participatory processes in law development are increasingly valued and advocated and adopted. This is particularly true in the environmental and related sectors, which have been influenced by the focus on participation in the Convention on Biological Diversity. Participation in the management of resources is increasingly seen as

important. For example, the Water Act⁸¹ establishes a participatory management system based on multi-stakeholder catchment councils. The process adopted for developing the draft Environmental Management Bill was also broadly consultative. This may be seen, as a spin off from the now widely accepted position that participation in environmental management is critical to its success. Environmental policy and the processes adopted in developing environmental policy and law have had a direct bearing on how key issues within the agricultural biotechnology domain are addressed.

There seem to be several parallel processes for law development in Zimbabwe. Some distinguishing features may be identified. Law development may be initiated by anybody – a member of the public, a ministry, a non-governmental organisation, a company or a member of the parliament. There are two options open to the initiating party – they may design the process⁸² or work with the Law Development Commission,⁸³ which is a statutory body. If they opt for self-design, the party initiating such development may engage in any public consultation process they desire. They will then need to submit their draft law to the Attorney General's office so that it can be written in legal language and made compatible with the country's laws. Although the AG's office should consider developments in the law internationally in practice very little attention is paid to it, this failure is primarily as a result of inadequate expertise and lack of access to resources. Alternatively, if they approach the Law Development Commission, the Commission will assist the initiating party identify 'the state of the art' in the sector of

⁸¹ Chapter 20:24; Also the Environmental Management Bill, 2000 and regional multi-lateral transboundary natural resource management agreements

⁸² This option was taken with the development of the Environmental Management Bill and the Research (Biosafety) Regulations SI 20/ 2000

⁸³ This approach was taken in the reform of the law of succession.

law concerned, commissioning experts to work along side the stakeholders and ensure a consultative process. Once a Bill or draft statutory instrument is prepared and presented for adoption by Parliament, the Parliamentary Legal Committee will consider its constitutionality and evaluate it against legal developments in that area generally. Individual members will informally canvass opinion on the issue. Where the Committee considers it prudent it will consult with relevant experts or stakeholders. In some cases they will hire experts to give an opinion on key issues.

Partnership, in all areas including law development, is increasingly urged at the global level. The Rio Principles and Agenda 21 set the framework for consultation in all spheres of development decision making by recognising the 'need to activate a sense of common purpose on behalf of all sectors of society' and that the 'chances of forging such a sense of purpose will depend on the willingness of all sectors to participate in genuine social partnership and dialogue, while recognising the independent roles, responsibilities and special capacities of each'.⁸⁴ Agenda 21 pays considerable attention to this issue. The Preamble recognises that effective broad public participation in decision-making requires new forms or approaches. Specific chapters address the role of different stakeholders including women, non-governmental agencies, the business sector, workers and trade unions and indigenous people. Agenda 21 acknowledges the centrality of information in creating effective participatory regimes.⁸⁵ These values find expression in the UNCED and post-UNCED generation of agreements. They serve essentially as guide or non-binding principle as opposed to a rule.

⁸⁴ Agenda 21, Chapter 27.2

⁸⁵ Chapter 23.2

There has not been a corresponding change in practice for treaty adoption even though, at the global level, there is an increasing recognition that participatory approaches are important at all levels of decision making. The adoption of treaties is governed by the Constitution⁸⁶ and Rules of Cabinet have been adopted to give effect to this.⁸⁷ Guidelines for the negotiation process are established. There are four separate stages of approval, firstly by the Public Agreements Advisory Committee (PAAC), then by the Cabinet Committee on Legislation (CCL), followed by the full Cabinet, and lastly by Parliament itself.⁸⁸ The Constitution provides that every treaty 'shall be subject to approval by Parliament'.⁸⁹ However the power to enter into a treaty vests in the President or a Minister duly authorised for that purpose,⁹⁰ subject to the advice of the Cabinet. Treaty adoption is largely seen as an executive function, subject only to parliamentary approval, consequently the process is seldom participatory. The general public and even special interest groups are generally not consulted.⁹¹ Patel and Mohamed-Katerere (2001) observe that this practice appears to have been followed without question and will no doubt continue without change in the absence of specific measures to liberalise the process of adopting treaties.

PERSPECTIVES ON BIOTECHNOLOGY, ACTORS NETWORKS AND THE CONSTRUCTION OF POLICY

The main debates and concerns around biotechnology in Zimbabwe reflect those at a global level. Key issues, central to the question of what

⁸⁶ Section 111B

⁸⁷ *Cabinet Circular No. 2 of 1997* Internal Procedures Governing the Adoption of International Agreements, Conventions and Treaties, issued in June 1997. This is supplemented by *Cabinet Circular No. 3 of 1999*

⁸⁸ Patel and Mohamed-Katerere (2001)

⁸⁹ Section 111B(1)(a)

⁹⁰ Section 31 (H) 1 as read with Section 31 (H) 4

⁹¹ Patel and Mohamed-Katerere (2001)

the way forward for agriculture is, have been its impact on food security and local livelihoods, intellectual property rights and indigenous knowledge, rights to genetic resources and traditional resource rights and biosafety.

This section identifies the various perspectives and considers how they have influenced policy development. Additionally it looks at the range of actors involved and the kinds of networks they form and how these contribute to or influence the formulation and implementation of policy. What emerges is that there are multiple actors who influence the development of policy either directly or indirectly. Alliances between them are not constant but fluid - redefined in relation to issues and even sub-issues. Nevertheless, certain institutions and individuals continually emerge as dominant and influential in the construction of policy. Others, particularly resource poor farmers, but also consumers, are either absent or relatively inconspicuous.

Issues of power and knowledge appear to be the key factors influencing the construction of policy. There are two critical aspects here. Firstly, how the relationship between these actors. Their respective authority, knowledge, access to resources, interests, vocal presence and academic, social or political prominence, shapes the content of debate and the construction and understanding of 'policy gaps and problems'. Secondly, perceptions and approaches about the role and place of science in development and hence in regulation and policy. A related issue is how knowledge is constructed, the relative status of different forms of knowledge and its influence on the construction of policy and legislation.

This section also considers the interplay between national and international institutions, agreements and processes. Developments at a global level seem to be critical in shaping approaches. Some attention is given to the nexus between the national and local (district, ward, village) level and how this shapes policy.

Unfortunately it has not always been possible to trace the historical evolution of these perspectives and consequently the way in which various networks have come to be constituted over time is not always clear.

Food security, Improved Livelihoods and Development

At a national level achieving food security and improving livelihoods is seen as key to development. As discussed, this is a key focal point of development and agricultural policy. Most actors link the issue of biotechnology to the realisation of these objectives, but there is little consensus about what the impact biotechnology actually is. A number of distinct narratives can be identified.

A predominant narrative advocated mainly by those involved in developing the technology, including commercial seed enterprises, scientists and state research institutions, is that biotechnology is the most important tool for achieving food security. Simply, if food shortage lies at the source of food insecurity then the solution must be to increase production or yield.⁹² The need to increase yields is seen as particularly important in the context of 'land shortages'.

⁹² See for example the Agricultural Policy

Alternatively the need for investment in biotechnology is perceived to stem from the inability of the majority of the population to derive their livelihoods from agriculture (given skewed land distribution and the limited productivity of the agro-ecological zones). Biotechnology, in this context, is seen to hold the promise of increased production through the use of more pest resistant or drought resistant crops. In the words of a Monsanto researcher, it offers the possibility of 'more food on less land with less costs'. In some instances a direct correlation is made between this increase in production and improved livelihoods. Proponents of this position may be broadly divided between those that support the use of biotechnology based on genetic modification and those that focus on more traditional uses of biotechnology. Nevertheless there are some that believe that this approach has 'missed the boat'. Hunger, it is argued, is predominately the result of poverty and inadequate access to land and other resources and these issues must be addressed if food security is to be achieved.

Complementing this approach - that fewer farmers need to be more productive to support a growing population - is the view that there is a need for biotechnology development in other areas including industry and pharmaceuticals. Its use is seen as critical to opening up other economic opportunities and addressing the call of ZIMPREST to 'accelerate the pace of development' and attack 'poverty, the last great enemy of the people'. Support for this approach is found at SIRDC.

A more complex approach, and one promoted mainly by development NGOs, is to link development and the use of biotechnology directly to farmers needs. From this perspective the use of biotechnology is not simply about increasing commercialised food crops but addressing food

gaps and production problems. For example, the impact of environmental degradation and deforestation on wild varieties of food crops is sighted as an important reason for the use of biotechnology⁹³. Several projects using traditional biotechnology have this kind of focus.

Many actors, including both scientists and NGOs, are concerned about the appropriateness of genetically modified crops for resource poor farmers given their socio- economic conditions. The debate revolves around the costs to small farmers and some of the precautionary measures required in planting. For example in respect of Bt crops, the creation of 'refugia' is seen as impracticable given land size constraints. Additionally costs of licenses and seed are important concerns and are seen as hurdles by many. Nevertheless for some this does not necessarily rule out the use of genetically modified technologies and products. Instead it is felt that the technologies should be utilised in response to self-identified farmer-needs. Notwithstanding these difficulties, biotechnology is seen as the reality of the twentieth century and consequently consumers and farmers need to engage and shape the destiny of these products and technologies. The approach of one NGO is captured in the words of their director: 'we have to accept that this is the way of the 21st century... but the technology should be home-grown ...we should not simply be a testing ground'. There is also concern that the technology can be used to undermine the interests of resource poor farmers while promoting those of commercial enterprises through, for example, the use of the terminator gene.

⁹³ The BTZ mushroom cultivation project for example seeks to restore access to mushrooms by resource poor farmers who had traditionally incorporated it as a key protein source into their diets by increase mushroom production to complement the declining wild varieties due to deforestation. Mushroom cultivation seen as key in overcoming nutritional problems.

Some actors, in government agricultural research institutions and in the development sector, challenge the assumption that the introduction of genetically modified crops will necessarily result in improved yields. We do not know at this stage, it is argued, how these crops tested elsewhere will perform in the conditions of Zimbabwe and what the direct and indirect impacts on agricultural systems will be. This, however, does not necessarily exclude experimentation with technologies for genetic modification.

To some extent all these different narratives place some importance on the 'non-technical aspects of addressing poverty'. Such aspects would include better access to productive land, water and other agricultural inputs. Additionally the issue of poverty needs to be addressed and agricultural strategies need to complement other strategies for its alleviation. One group identifies 'intellectual property rights' for farmers and community groups as key to establishing sustainable systems. This is generally an argument put forward by farmers' groups, development NGOs and government research agencies rather than scientists and commercial enterprises.

A less dominant and opposing narrative articulated by some farmer networks and development NGOs is that biotechnology poses a direct threat to food security because livelihood systems of small farmers are being undermined through the drive towards monoculture⁹⁴ and the loss of indigenous knowledge systems. The need for genetically modified vitamin enriched crops, for example, is seen to stem from the loss of multiple food crops and the introduction of agricultural systems that marginalise traditional non-commercial varieties that have been key

⁹⁴ Developments in biotechnology are believed to contribute to this.

nutritional sources. This perspective is not shared by all development NGOs. One argued that such impact is unlikely, as small-scale farmers are likely to persist in multi-crop approaches. Small-scale farmers, it is argued, are highly experimental and are more likely to inter-cultivate genetically modified varieties with traditional varieties rather than adopt mono-crop systems.

A variant on this perspective is that livelihood opportunities are threatened not only through threats posed to agricultural systems but also by the closing of market opportunities, particularly in Europe. Interestingly this concern is shared by both a local level NGO that works directly with resource poor farmers and sections of the commercial farmers' union.

Issues of biosafety as they relate to food security only emerge very superficially. One agricultural research institution cautioned that given that the impact on the environment and agricultural systems is unknown it is important to experiment with genetically modified crops and determine their impact on local livelihoods (including on wild varieties) within controlled testing systems. Thus potential benefits are not seen as a given but as a direct consequence of how biotechnology issues are dealt with in the real context. The solution, from this perspective, is to focus on developing appropriate biotechnology suited to the economic, social and ecological circumstances of the farmers and to have increased investment in biotechnology and supportive training within national institutions. The success of this approach is linked to improving opportunities for economic empowerment and poverty alleviation by generating employment and encouraging entrepreneurial initiative. The focus on investment in people is also a key focus for ZIMPREST.

Increasing capacity in this area is seen as essential to ensuring Zimbabwe has a 'greater slice of the biotechnology cake'. Similarly issues of food safety are not seriously addressed. Senior officials at SIRDC dismissed such concern noting instead that genetically modified crops have been used for a long period of time in the United States. Comfort is taken in this – if there was a serious problem 'the Americans' would not allow it.

Resource poor farmers are conspicuously absent from the national debates around this issue. Although in some instances ZFU has participated. However there are several NGOs and an increasing number of scientists that purport to speak on behalf of such farmers. A number of NGOs have projects in which they work directly with farmers in the communal areas. The different approaches taken to these issues probably demonstrate that it is not possible to talk of 'the perspective of resource poor farmers' as an undifferentiated group. Field visits to the project sites of one development NGO, that is actively promoting the use of biotechnology, revealed a growing support for and involvement by local resource poor farmers in the use of biotechnology in legume, maize, mushroom and sweet potato production. Nevertheless, according to Saruchera (2001) the 'trip revealed that the level of biotechnology appreciation and awareness among the farmers is very low or non-existent in some cases. It was interesting to note that in the majority of cases, the farmers are aware of the benefits of the activities they are engaged in but do not know the science behind the activities. They appeared preoccupied with the perceived or real benefits associated with the activities more than anything'. No genetically modified crops were used. Interestingly one sub-project sought to use biotechnology to rejuvenate the use of local sweet potato varieties by the control of

viruses and the production of pathogen free high quality seed stocks. This project was supported by research and development institutes including the University of Zimbabwe, BRI, CIMMYT, the Horticultural Research Centre, Agricultural Extension Services and DR&SS. The Zimbabwe Farmers Union (ZFU), a union of farmers in the communal areas, also supports the project.

The perspective that biotechnology presents really opportunities for Zimbabwe to address poverty and development concerns has been central in influencing the development of policy. The advocates of this position have, on this basis, been able to win acceptance at the governmental level that a regulated space for such research and testing of GM crops must be allowed. This regulated framework is seen to address social and environmental concerns whilst creating the space for new ventures. The acceptance that biotechnology must be given a space for development may be attributed to the growing social and economic crisis and the urgent need to find new ways of addressing development issues as the old approaches have clearly failed. Additionally recurrent droughts, unstable climatic conditions and the recent political crisis seem to have undermined Zimbabwe's food self-sufficiency. Thus it is perhaps not surprising that the Minister of Agriculture publicly supported and welcomed the establishment of the Biotechnology Association of Zimbabwe (BAZ) (2001), which was created at the instance of BTZ, COMMUTECH/CTD and BRI to promote discussion around the issues of biotechnology. Although it might be argued that the real objective is to promote acceptance of modern biotechnology as contrary opinions were ridiculed at the launch meeting as backward. Additionally, winning government support for research and development activities in biotechnology is clearly essential if a secure environment for private

sector investment is to be ensured. The need for this security has moved to the fore as donors are pulling out of Zimbabwe at the end of current projects (due to the current political turmoil) and public sector researchers lose their traditional financial support.

Interestingly institutions engaged in biotechnology R&D have through Dutch funding been able to establish farmer-based projects that 'demonstrate' the benefits of biotechnology to small-scale resource poor farmers. A consequence of this is the support of farmers in these projects is extrapolated to imply the support of all farmers. The unspoken implication of this is that opportunities in GM crops must be explored. These research institutions and NGOs have, with donor support, effectively been able to present themselves as the voice of poor farmers. As noted above, these projects are based on traditional biotechnology and do not extent to GMO. It certainly appears that farmers' support needs to be understood in the context of poverty and inadequate infrastructural resources and the need for immediate relief and not a blanket support for biotechnology. Projects like these bring immediate benefits: food in the stomach, technical support and investments. The significance of these factors, and improved yields, should not be underestimated as the basis for winning farmer support. The finding of the field visits in these districts that farmers had no prior understanding of genetic modification further supports this. Saruchera notes, however, that after discussions, 'the thought of 'playing God' by mixing genes...was horrific for some farmers'.

Interestingly state agricultural research institutions have not been dominant players although they do have a presence on the Biosafety Board. The reasons for this are unclear, nevertheless a few points might

however be worth noting. Firstly, their research strength lies in traditional breeding. Secondly, given the limited government funding available branching out into modern biotechnology seems unlikely. Thirdly, the limited resources available need to be used in the most efficient way possible to support poor farmers – this might mean by doing what one does best rather than through experimentation. In this context biotechnology may well not be a priority issue for these institutions. Nevertheless there has been some suggestion that the scientific communities dominance in the RCZ has been used to create a disproportional presence of scientists.

The centrality of discourse around livelihoods and poverty – and the willingness of scientists to engage with this issue – probably stems from the fact that the now well-developed NGO movement has focussed on, and identified, this as a key issue. Moyo and Makumbe (2000) noted that by 1987 a new wave of NGOs had emerged that went beyond simply trying to establish and support community level income generation activities to addressing issues of poverty alleviation. Many of these NGOs have also developed links with NGOs around the world and have developed a profile outside of Zimbabwe. Also significant is that many NGOs have become efficient, competent and respected technical, social and political commentators and actors. Notwithstanding this, there is not a completely open armed approach to NGOs. Two NGOs with strong farmer links have been effectively excluded from the policy process. This may be attributed to the fact that neither of these organisations has been able to create alliances with powerful or prominent individuals or institutions. One NGO that has been able to create an effective presence in the debates and policy processes is COMMUTECH/CTD. It might well be worth noting that the directors of

the two excluded NGOs are both women, of foreign origin and white, while the director of COMMUTECH/CTD is a man, Zimbabwean and black. It would seem that gender might be an important consideration where the position being advocated runs against the more widely accepted wisdom. Government policy processes remain dominated by men. Given this, and the need for scientists to demonstrate an NGO link, COMMUTECH/CTD seems to be the natural choice. It is unclear how significant the issues of race and nationality are in this context. Also COMMUTECH/CTD's ability to effectively raise donor funding in this area may also be an important consideration.

Given the traditional links between the government and the scientific community in defining agricultural policy as well as the ability of scientists to effectively use their presence in the RCZ to regulate and to represent themselves as the voice of the poor alternative perspectives have effectively been sidelined.

Priorities for Scientific Research

It is difficult to fully assess the process research and development and other institutions engage in when defining research priorities or focuses. All claim to engage in PRA exercises at the local level, which determine priority areas for resource poor farmers. However, in the absence of research into this, no real conclusion can be drawn about the effectiveness of these PRA exercises. Nevertheless, there definitely appears to be a high degree of synchronicity between those crops identified by different organisations as priorities for research. There is, however, little consensus about what kind of research should be pursued in order to improve existing varieties. Some have opted for organic varieties while others lean to improvement through biotechnology. Given

poor systems of communication, and organisations' general inability to engage in any meaningful dialogue, with resource poor farmers about technology it seems that the choice of research method is linked more to the organisations own concerns, rather than those of poor farmers, and to sources of funding.

NGOs, the private sector, research institutions and agricultural R&D institutions all agree that improving food crops, in particular those suited for poor agro-ecological conditions, is an important area for research. Key problems, identified across the board, that need to be addressed include pest resistance and drought tolerance. Improving maize varieties is seen as important by most as this is an important food and potential export crop. Some NGOs, and the Agricultural Policy, also identify small grains as important. Most institutions also accept that research into improving cash-crop varieties, and particularly those suited to poor agro-ecological regions, is key. Most agree that cotton is a key area for improvement as resource poor farmers currently produce 80% of Zimbabwe's crop. From the large scale commercial farmers' perspective tobacco is a key crop. This crop is an important foreign currency earner and in 2000 earned Zimbabwe Z\$19 billion of which the government collected Z\$600 000 million in levy fees. The exchange rate was officially pegged at US \$55 to Z\$1. The parallel market rate was then approximately 100:1.

One key institution engaged in biotechnology research and development is the Biotechnology Trust of Zimbabwe. They currently have biotechnology projects in growing mushrooms (fermentation), maize improvement, livestock feed and Sweet Potato (tissue culture). There is evidence of priority setting exercises based on both national consultation

and work with farmers at the local level. Its predecessor undertook a national socio-economic survey to identify constraints to farmers and to confirm the priorities set at a national workshop held in 1993. Two regions, Buhera and Wedza, were selected for project implementation because they cut across natural regions IIb to V which represent the diverse ecological conditions resource poor farmers find themselves in. Research and development activities were based on this assessment. Currently activities do not include genetic modification although it is not ruled out

The commitment to priority setting exercises, that include both national and local level consultations, may well be a result of the relatively strong and vocal presence of development NGOs. It might also be a donor requirement. BTZ's origins can be traced back to early (1989) collaboration between the Free University of Amsterdam and the University of Zimbabwe, which resulted in the formation of the Biotechnology Forum in 1992. A DGIS biotechnology initiative established the Zimbabwe Biotechnology Advisory Committee (ZIMBAC) in 1994. The Biotechnology Trust of Zimbabwe (BTZ) was formed in 1997 with Dutch funding and co-ordinates the initiatives of ZIMBAC.

Globalisation

There are a wide range of perspectives around the appropriate path for economic development. The current economic crisis (and the need to achieve economic stability) as well as the drive towards globalisation seems to have had some important ramifications. Firstly it seems new alliances between scientists and seed companies have emerged and secondly, NGOs have been marginalised in the development (and refinement) of economic policy. This is manifested, for example, in their

exclusion from the process of adopting IPR agreements in fulfilment of the WTO agreement.

The private sector favours economic and financial reforms that create a secure investment environment and relatively free conditions for import and exports. Conditions and terms of investment and operation across national borders will have to become more and more similar in order to meet new global standards. While NGOs and consumers accept and support the need for a stable economy, many have expressed concern about the drive towards integration into the global economy and the ramifications it has at a national level. Concern arises about globalisation partly because it fundamentally changes the relationship between the state and citizens. Relationships of accountability change – the state is effectively responsible to some global coalition as opposed to the populace. The ambit for engagement is effectively narrowed and the citizen is transformed into a consumer. The 'citizen' is less and less able to demand that the state adopts development paths that are appropriate to its circumstances. Instead the state must now show why its interventions in the market are justified and that they don't violate global agreements. A NGO statement to the EU noted that 'the global trade strategy of the EU is inimical to our development interests and aspirations. Trade arrangements should be driven by development imperatives rather than by the dogmatic objective of 'integrating ACP countries into the world economy' through indiscriminate trade liberalisation'.⁹⁵ They opposed the 'inclusion in the Cotonou Agreement of the same 'new issues' that are highly contested by developing countries in the WTO, such as agreements on foreign investor

⁹⁵ Relations Between Africa And The European Union In The Twenty First Century' Civil Society Declaration To The Ministers Of Foreign Affairs Of SADC And The EU Meeting In Gaborone, 29-30 November 2000 <http://aidc.org.za/sapsn/declaration/gaborone.html>

rights/guarantees, intellectual property rights, competition policy, governments' procurement, and environment and labour standards'. As the government seeks to stabilise the economy a move towards global standards is evident, in particular a drive towards achieving full compliance with the WTO agreement. In 2001 the Ministry of Finance moved almost unilaterally to implement new legislation on intellectual property rights. There was little stakeholder consultation even though this issue had been a subject of considerable multi-stakeholder discussion over a long period of time.

There are also quite distinct perspectives about what constitutes acceptable market limitations. An increasing number of civil society organisations are advocating greater regulation of food production in order to protect consumer interests both in relation to commodity prices and food safety. Similar moves are also evident at the global level. Interestingly in our interviews all actors, including the private sector, accepted that research and field testing of GMO needs to be regulated in order to address consumer concerns around safety. There was some concern that the ZIMPREST objective of further domestic deregulation in order to promote investment should not result in a completely unregulated environment as an 'uncontrolled' environment would simply mean transforming Zimbabwe into a testing and dumping ground. Nevertheless the reality is that some private seed companies have chosen to run trials elsewhere in the region rather than Zimbabwe. South Africa has become a key site. The Herald (2 May 2001) reports that 'more than 9000 smallholder farmers (in Makhathini in KwaZulu-Natal Province) have embraced genetically engineered bollgard cotton, a product of Monsanto and Delta Pine'. They attribute this to financial and political instability rather than the controlled research and testing

environment. Key sectors of the private sector have expressed concern about the regulation of the import, sale and labelling of GM food stuff. Monsanto, argued at the launch of the BTZ, that there was essential no difference between a GM tomato and a conventionally bred tomato and hence no need to regulate. Labelling of GM foods was seen to create a controversy and raise fears unnecessarily. Although consumer concerns have been publicly ridiculed by prominent scientists, the Government has recently imposed a ban on the import of genetically modified foods. Ironically the Government, through the Biosafety Board, has granted several applications for field trials of genetically modified maize and cotton. Also following the success of farmers in Makhathini several key actors, including SEEDCO, DR&SS and the Ministry of Agriculture, have made statements about the appropriateness of the crop for small scale farmers and seem concerned to ensure that the regulatory system does not become overly restrictive. It is also reported (Herald, 2 May 2001) that the Cotton Company has made applications for field trials for bollgard cotton for the next season. It appears that these applications have been granted. It is perhaps worth noting that there have been a series of visits by members of the Biosafety Board, key NGOs and researchers to the Makhathini project.

The shift to private sector investment elsewhere in the region where field testing of GMOs is less restrictive seems to have raised concerns about Zimbabwe's position in the regional economy. The Makhathini success seems to have also raised concerns that Zimbabwe will become less competitive (compared to its neighbours) in world markets and that its current agricultural status will be threatened. This shift to further integration into regional and global economies and markets is consistent with the approach for economy recovery adopted in ZIMPREST.

For some the use of GM crops is not the way to secure markets. Interestingly, unlikely partners – the Commercial Farmers Union and an anti-biotechnology NGO with a resource poor farmer focus - argue that, in the wake of mad cow disease and the trend in the European market to organic foods extreme caution must be exercised in letting GMOs in. Once in it will be difficult to prevent GMOs from entering animal feed and/ or convincing the European Market of this. Consequently this will threaten export to Europe market for both beef and dairy and undermine rural livelihoods.

As noted earlier, a key focus of ZIMPREST is the creation of a stable investment climate. ZIMPREST identifies the need to develop approaches to strengthen monetary management, slow credit creation to reduce inflationary pressures, and to liberalise the financial sector as key. Also seen as critical is the need to stabilise exchange rates and at the same time to create a market based foreign exchange system. Another feature of the global driven economic reform process, and now internalised approach to promoting economic growth, is the downsizing of government with the resultant decrease in funding for public services including public research. This, and ever-decreasing donor funding, effectively means that there is an increasing likelihood of scientist-private sector collaboration in research. In the context where the biotechnology scientific community is very small, and where they are effectively the regulators, this is a particularly problematic trend and potential leads to problems of conflict of interest. This issue is returned to later in the paper.

Interestingly with the ban on the import of GMO foods announced in September 2001 the government has, in its policy, responded to the seemingly contradictory interests of on the one hand creating a stable climate for investment in biotechnology and on the other addressing consumer fears and rights. The reality however is that this bi-polar approach is probably perceived to be the best economic option rather than a response to rights.

Risks and Rights

There is little consensus about what the relationship between science and development or technology and development should be. For many science, exploration and development is what drives progress and therefore should only be contained under very limited circumstances – where it poses a real and identifiable risk to human society either directly (e.g. health) or indirectly (unacceptable environmental damage). The application of science is seen as an inextricable step in the path of progress. For others a distinction needs to be made between science and its application. So although science may offer new opportunities for development it must be recognised that it may not; consequently its application must be limited and negotiated in the context of multiple rights, interests and values. In the area of biotechnology in Zimbabwe today this comes to the fore in approaches to dealing with the uncertainty and potential risks of genetically modified crops. As can be expected views and approaches are highly polarised. At the core of the difference in approach is, firstly, a lack of consensus about what is meant by 'uncertainty' and 'risk' and, secondly, the absence of agreement on who has the right to decide what level of uncertainty and risk are acceptable.

At one level biotechnologists acknowledge that there is uncertainty about how a genetically modified product might behave. The solution (and indeed one that finds expression in the Biosafety Regulations) is to create systems (monitoring, controlled testing environments etc.) in which the level of risk can be ascertained. Risk assessment techniques adopted under the regulations are based primarily on familiarity and substantial equivalence. The approach to risk assessment adopted in regulations is described more fully in the first part of the paper. NGOs and others with a development focus understand the issue of uncertainty as being not just about the behaviour of the product but its impact in a particular social and economic setting. What is important here is the impact on the livelihoods of the rural poor, their agricultural systems and natural resource base, its use and likely value. NGOs coming from a rights perspective are concerned about how biotechnology may impact on certain human rights that are perceived as fundamental to the integrity of human life. These rights would include the right to life, health and the environment.

Divergent approaches around the extent of risk stem, in part, from how risk is conceptualised. Many non-biotechnologists believe that risk is not just about direct, immediate impacts of great magnitude but about cumulative and indirect impacts. Also critical are impacts in spatial and temporal terms. The predominant biotechnologist perspective, that also finds expression in the Research (Biosafety) Regulations, is that risk can be scientifically measured or its level reasonably ascertained. Consequently risk assessment is seen as technical and thus the determination of risk is limited to scientists. The issue of risk is effectively separated from the social, political and ecological context. In the words of one senior scientist and Biosafety Board member 'we don't

want politics to get mixed up here'. Or in the words of another Board member, 'Uncertainty ... is not a scientific reality ... but a problem of perception and politics'. From the scientist perspective once a finding has been made about the level of risk and whether or not to release the product – the prerogative then passes to the public. Consumers are then free to decide whether to use a product or not. This conceptualisation of risk effectively reconstructs the public and they move from being citizens (with choices about livelihood systems and societal values) to being consumers. This trend is of course complemented by the globalisation of markets, which also effectively redefine the relationship between the public and the state. Given this the issue of citizen's rights are effectively excluded.

Most agricultural research development organisations seem to focus on the need for controlled testing and urge a cautious approach. However a senior official at a state agricultural R&D organisation criticised this risk assessment approach on the grounds that it does not take into account general impacts on agricultural systems livelihoods. One group with a farmer focus argues that the introduction of biotechnology crops creates threats to bio-diversity as it tends to focus on mono-cropping a consequence of which is the loss of wild varieties. This has negative spin off impacts for ecosystem survival and biological diversity conservation generally. There is clearly the potential for new networks to emerge - that draw in agricultural research organisations (or individuals from them), farmers' groups, consumers' groups and citizen rights' groups- that advocate for a more holistic approach to risk.

Similarly there is little consensus about the extent of environmental impacts. Developers of biotechnology and scientists engaged in related

research tend to focus on the possible reductions in the negative environmental effects of agriculture as the need for pesticides subsides through the development of with pest resistant crops. Such crops would also mean the demand for land (and hence conversion) would be reduced. Others express concerns that the risk assessment processes do not adequately address the issue of environmental impact assessment nor recognise key principles that have evolved in that area, like the issues of participatory monitoring and environmental impact assessment. Given that the Ministry of Environment was not included in the policy formulation process or on the board this state of affairs is, perhaps, unsurprising.

A key issue is why an anti-society approach to risk has been able to assert its dominance despite numerous concerns from civil society institutions, agriculturists and environmentalists. In the first instance it appears to be about how expertise and competence is perceived. The issue of biotechnology and biosafety has successfully been presented as a scientific and technical matter. Not surprisingly civil society institutions, NGOs, developmentalists, ethical bodies and human rights bodies are not represented on the Biosafety Board. This approach runs counter to the now widely accept view that citizens have a right to participate in decisions that effect them. These rights include the right to basic needs, to safety including a healthy environment, to information and consumer education, to make a choice, to be heard and to legal redress. Some Board members justify the exclusion on the grounds that 'risks are minimal' and also that 'risk is the essence of scientific and human development' and that the involvement of civil society will result in 'holding back the clock'. This raises two issues. Firstly, information and knowledge about biotechnology (along with other knowledge) is

important to enable the public to make informed choices. There is clearly a lot of misinformation about probable impact – farmers in the BTZ project area postulated that biotechnology may be the cause of HIV/AIDS. Secondly, this concern does not acknowledge that decisions may legitimately be made on grounds other than the scientific, for example, ethical concerns about tampering with nature. Another board member, noted that in the context where there is 'no proven risk there is no need for special safeguards'. From this perspective citizens' rights are not at stake and consumer rights, it is argued, can be exercised by not buying the products. All knowledge (and values) other than those of science become irrelevant. However, it should be noted that some members of the Board do accept that broader representation and involvement should be provided for.

This 'science focus' however does not explain the effective sidelining of environmentalist and conventional agriculturists, who are also scientists. The guidelines recognise that ecologists may need to be part of a risk assessment team yet the reality is that the board has become the terrain of biotechnologists and no ecologists and environmentalists are included. This contradiction between stated policy and practice may be the result of the need, on the one hand, to keep abreast with global developments and concerns about biotechnology's impact on the environment and biological diversity and, on the other, the impulse to retain control. One motivation for this might be the desire to control access to much needed funds. One senior official of the Biosafety Board noted that biotechnology was the new trend to address poverty and had significant donor funding; environment was becoming less lucrative. It was suggested that the Ministry of Environment's interest in biosafety was driven by their need to bolster an ailing ministry. Officials in the

Ministry of Environment argue that they should have been key players in the development of the Biosafety Regulations given that they are responsible for the implementation of the Cartagena Protocol on biosafety. Key players on the Biosafety Board, who were involved in drafting the regulations, argue that the approach in Cartagena applies only to transboundary movement of GMOs and hence there is no need for the Ministry of Environment to take a lead role. Given this they assert that there is no need to extract key principles and use them as a focus for law development here. It seems that the Ministry of Environment has been invited to some recent meetings of the Board. This may be indicative of emerging wider consultations at the inter-ministerial level. It remains to be seen how decision-making processes will evolve as other stakeholders begin to be more vocal about their rights and interest and their desire/ need for inclusion. From industries' perspective the mix of skills on the Board is seen as satisfactory and there is a feeling that membership should be restricted to those 'involved with the technology' this apparently includes farmers but not consumers. Some concern is expressed about confidentiality of information and greater inclusion could slow down the bureaucratic process for granting applications.

The very limited role of other experts in drafting the regulations has affected the way in which the issues of risk and citizens' rights have been dealt with. For example, there was no attempt to consider the implications of the international environmental law regime for law and policy development in this area. Indeed this is reflective of the fact that legal involvement was limited to the attorney general's office checking for consistency with Zimbabwe's laws.

Related to the issue of risk and its assessment is the issue of liability. Again perceptions around responsibility and liability vary. It is argued that those responsible for the approval process and also product development need to be held legally accountable for unplanned impacts. Some feel that distributors of products should accept responsibility. One civil society group advocated that there should be legislation that allows the courts to force disclosure of key information. One scientist felt that the individual consumer must accept some legal responsibility for their use of GMO products. Saruchera (2001) notes that farmers, in the BTZ project, felt that it was the Government's responsibility to protect its citizens; however there was some feeling that individual farmers are responsible for any local level impacts of their plantings.

The Institutionalisation of Scientists as Regulators

The perception that biotechnology (and the choice of whether to apply it) is purely a scientific issue, and does not raise ethical, moral, development or other considerations about livelihood choices, has been key in informing the content of the Biosafety Regulations and cementing the role of scientists. Not only does this perspective form the basis for approaches to risk assessment but it also informs the approach to authority. In tracing the role of different actors and the emergence of actors networks in the process of developing the biosafety regulations the resulting dominance of scientists becomes understandable.

Scientists engaged in biotechnology research were the key actors in the process that led to the adoption of the Biosafety Regulations. These included individuals at BRI, SIRDC, the Tobacco Research Board and the University of Zimbabwe. The initiative to develop regulations began in 1991. Initially a University of Zimbabwe lecturer (now a member of the

Biosafety Board) undertook an informative visit to The Hague. Guidelines were then developed on the basis of developments and experience in the Netherlands, European Union and South Africa. Subsequently legislation in Australia and United States of America were considered and fact finding/ information collecting visits to these countries were undertaken. In 1992 these initial guidelines were presented to the first stakeholder consultative meeting. A follow-up meeting was held in 1993. Various meetings were apparently also held with colleagues in the scientific community in Uganda and Kenya. In 1995, *Biotechnology*⁹⁶ reported that draft guidelines had been prepared with the technical assistance of the Biotechnology Special Programme, of the Directorate General International Co-operation (DGIS), of the Netherlands Ministry of Foreign Affairs. Draft Regulations were eventually presented publicly in a workshop in August 1998 for comment.

One early concern revolved around what kind of instrument to adopt and where to house the new law developed for biosafety. Regulations as opposed to an act were adopted for a variety of reasons. Developing a new act was seen as difficult and time consuming. As explained earlier it requires a number of levels of scrutiny before it becomes law. Additionally an act is less flexible and in particular is cumbersome to change. Regulations are seen as 'open-ended' capable of modification based on learning and reflection. According to one researcher involved in the development of the regulations, experience in both the United States and India indicated that regulations were easier to apply and this influenced the choice. Ironically by avoiding the development of an Act and going for a flexible instrument a less participatory approach became

⁹⁶ A magazine produced by ZIMBAC with financial support of the Biotechnology Special Programme of the Directorate General International Co-operation (DGIS) of the Netherlands Ministry of Foreign Affairs.

possible. Given that this initiative was seen predominately as 'an initiative of researchers' other researchers were consulted (including in the Ministry of Agriculture) but no consultations were held with the Ministry of Environment. Given this researcher focus it is not surprising that the Research Act was seen as the appropriate place to locate the regulations. The Research Act was seen to cover all aspects and areas of research and hence it was identified as the key place for regulations. Consequently a process was initiated in 1996 to amend the Research Act to create the legal basis for the regulations. In 1998, it was amended to give the RCZ the function of controlling potentially harmful research and the authority to establish safety boards. On this basis the Biosafety Board, comprised of scientists from key institutions, was established. The composition of the board reflects the predominance of the 'interest of scientists'.

A number of unfortunate consequences of this approach are evident. Firstly, the Board is vested with conflicting mandates that can easily lead to a conflict of interest. The scientist has effectively emerged as 'policy maker, regulator and enforcer' as in each situation they are believed to be the most highly informed. This runs counter to the basic governance principal that there should be a separation of powers and checks and balances on decision-making. Secondly, the minimal public inclusion resulted in a primary focus on the rights of scientists and developers of biotechnology and neglected the rights of the public. So for example rights of confidentiality are established while no systems of public accountability are created. There are no obligations to give reasons for decisions or to require (other than within limited circumstances) the disclosure of information. Thirdly, given the very small scientific biotechnology community, many board members wear a number of

conflicting hats. A significant number are engaged in biotechnology research, or head institutions that are, yet at the same time they sit on the board as regulator and monitor. It is not clear, how the issue of conflict of interest will be dealt with. It is worth noting however that the regulation's provisions on conflict of interest is restricted to close relatives. It is not known at this stage what products and applications have been granted although preliminary information suggests that some applications have been granted. Some applications, it appears, were granted even before the board was officially constituted, among these is a field trial by a tobacco research company. It is not clear how decisions will be made on a day-to-day basis and whether as interest and concerns develop greater consultations will take place and new checks and balances will be created.

Public Participation

As has already emerged in the preceding discussion, approaches and attitudes to public participation in drafting the Biosafety Regulations, and defining policy, are quite divergent. Despite this there was no real public critique of the process. This section looks briefly at why this exclusion was possible, the responses of excluded actors and how this exclusion contributed to the adoption of other policy processes.

It is interesting that the more public and consultative processes used in developing the Environmental Management Bill (EMB) were not used here. As discussed earlier a key factor in the drafting of regulation seems to be that the issue was presented as a technical and scientific matter rather than a development one. By presenting the issue of the regulations as a matter of science, and not livelihoods or rights, the rules for engagement became unnecessarily narrow. Given the lack of

access NGOs and other civil society institutions had to accurate and understandable scientific information it was virtual impossible for them to challenge approaches, engage with the scientists or demand inclusion. In contrast in the EMB process presented the need for sound environmental management as an issue that touched the very sustainability of human life and hence drew in a wide range of actors. Other important differences are evident in these two processes. In the case of the EMB participatory approaches were not only the result of an active and vocal NGO sector but also as a result of a drive at the global level towards participatory approaches in environment and the centrality of the concept of good governance to environmental practice. As noted earlier the environmental NGO movement was relatively well established and many NGOs were recognised as technically competent. Since 1992 a new generation of multi-lateral environmental agreements have focussed on issues of participation, community rights and good governance. Zimbabwe is party to these agreements and has taken steps towards implementing them. The values expressed in these agreements were not simply global values but values that emerged in struggles around approaches to environmental management in Zimbabwe. Key values included the right of people to be involved in decision making that affected them, the need for a link between responsibility, authority and accountability and the importance of traditional knowledge and values in defining approaches to environmental management. Demonstrating a commitment to adopting these new environmental approaches also created opportunities for donor funding and support. These two processes are also characterised by very different understanding of what constitutes participation. The ability to challenge the existing content of the Biosafety Regulation and demand that issues or approaches be reconsidered is undermined

by perceptions of and attitudes to authority and a political climate in which any vocal public criticism is seen as hostile. A senior official at the RCZ for example stated that 'those that make noise outside will find that the door is shut'. Yet at the same time RCZ recognise that the participatory process must develop. Some officials at the Biosafety Board observe that 'the process of public inclusion costs money... must come bit by bit as public becomes educated ... currently the public has no capacity to articulate or understand the process therefore there can be no role for the consumer'. It is interesting that repeated articles in Biotechnology argue that 'to set up the relevant infrastructure for implementation' requires 'accountable citizens knowledgeable in agricultural research, policy issues, competence in genetics, gene transfer and molecular biology of gene expression and possibilities of transfer to non-target species'.⁹⁷ There has been no public challenge to this. Interestingly one perspective raised is that regulatory approaches are seen as an attempt by the public to control scientists.⁹⁸

Interestingly this lack of public involvement seems to inform perspectives about the motivation for regulation. Although the process to develop biosafety regulations started in the early 1990s there is a perception that the adoption of regulations can be traced to 'clandestine activity involving some local scientists and Monsanto'.⁹⁹ The need for regulations can be directly linked to the Government's development

⁹⁷ Biotechnology (1995) Volume 1. No3, page 2

⁹⁸ Mushove, P (1995) Biotechnology Volume 1. No3, page 6

⁹⁹ NGOs allege that 'in 1996, Monsanto illegally smuggled genetically modified cotton seed in for trials in Zimbabwe. They did this with the help of the Commercial Cotton Growers Association (CCGA), who has been pushing for local use of the technology for a number of years. Neither Monsanto nor the CCGA declared the seed as a GMO when seeking the import license from the Department of Agriculture. This is in clear violation of Zimbabwe's Plant, Pests, and Diseases Act, which calls for all foreign material brought into the country to be labelled clearly and monitored by the government. When the government discovered Monsanto's genetically engineered BT Cotton in the fields, the crop was almost ready for harvesting. After harvesting, entire fields were destroyed, reminiscent of the hundreds of acres of cotton fields that were burnt in Karnataka in Southern India when Monsanto tried similar sneaky tactics to bring BT Cotton into India'.

agenda and its focus on developing biotechnology. The regulations set the basis, not only for increased private sector investment, but also increased opportunities for collaboration between researchers themselves and large multi-national companies by creating a known basis for activity. There is concern about how emergent processes and rules at the global level may impact upon this debate and that ultimately biosafety rules may be seen as an obstruction to free trade. If this were the case the impact of WTO sanctions would be crippling. Zimbabwe's dependence on foreign investment undermines its ability to stand up to powerful multi-nationals.

Interestingly there is a parallel legal process, with a predominately civil society focus, to develop a products liability act.¹⁰⁰ This initiative focuses on corporate responsibility to consumers. Some key players suggested that given the closed space around the development of biotechnology policies consumers might at least be able to use this process to influence policy around GMO foods. In addition to the rights of choice the Consumer Council has raised ethical issues. They express concern in relation to GMO foods and note that 'there are people who are allergic to some products or who culturally are not supposed to eat certain foods, but there is no way that they can be sure they are not eating these things. You can say you don't eat pork but you could be eating food that contains materials that were genetically modified using pork and you would not be able to know'.¹⁰¹ With these concerns in mind it is reported that there is an initiative to introduce a diploma in Food Control at the

¹⁰⁰ There are also some reports that claim that the Consumer Council is lobbying the government to pass a Consumer Protection Act (that will make it mandatory for food products to have labels clearly showing their ingredients) and that the CCZ has come up with a draft document that contains such provisions and which it is hoping will be the basis for this Act. This Act will consolidate existing legislation on consumer issues. Zimbabwe Joins Genetically Modified Foods Fray Harare (Financial Gazette, March 9, 2000)

¹⁰¹ Consumer Council of Zimbabwe (CCZ) information officer Nixon Kanyemba. Zimbabwe Joins Genetically Modified Foods Fray Harare (Financial Gazette, March 9, 2000)

University of Zimbabwe (in 2002) with the help of Dutch trainers. Concern is also expressed that there is inadequate control over imports.¹⁰²

Institutions, representation and accountability

The issue of institutions, representation and accountability has arisen throughout this paper both in relation to processes of policy formulation and the composition of institutions. The dominance of the perspective that scientists have the right to determine paths of exploration and development effectively elevates them to *de facto* representatives of society and has shaped policy processes and institutions. Despite this dominance there is little evidence of hegemony. The dominance of this perspective has resulted in the creation of institutional systems in which there is little public trust. Some general observations are made here about how this has shaped the biotechnology arena.

At the governmental level several ministries have a direct stake in the issue of biotechnology as a result of their legal mandate. These include the ministries responsible for environment, agriculture, public health and technology. Some of these responsibilities may be linked to global mandates. For example, the Ministry of Mines, Environment and Tourism is the focal point and implementing agency for the CBD and the Biosafety Protocol.

Some feel that given these mandates the ministries should have been included on the Biosafety Board or at least involved in the drafting of the regulations. It is pointed out that there is a need for co-ordination and

¹⁰² David Nharia, an official at the Government Analyst Laboratory Zimbabwe Joins Genetically Modified Foods Fray Harare (Financial Gazette, March 9, 2000)

inter-ministerial understanding. Officials in the Research Council¹⁰³ resist this and state that the Board was not intended to be a stakeholder board but an expert body. They assert that the Board is capable of dealing with all relevant concerns and impacts, yet they refused to disclose who is on the board. They assert that anybody aggrieved by a decision of the Board can make representation to the Board. It is difficult to see how this could happen when the processes of the board are not public. Further officials at the Research Council feel that this debate is totally inappropriate as the 'authority to appoint lies with the President and not the public'. Interestingly not all members of the Board share this view some feel that broader representation is essential if the key issues of environment and ethics are to be addressed. They recognise that this is important for the Board's credibility and public trust.

Similarly issues of civil representation and public accountability arise in relation to the board. Most interviewees took the approach that such participation was important 'in every way and at every stage'. It was pointed out that the challenges facing the board are not simply ones of hardcore science. One NGO suggested that a better approach might have been to have a broader public interest board with specialist technical committees. The importance of this lies in not just taking a biosafety perspective to approval but addressing the issue of what gaps new crops fill. Poor nutritional status, they argued, could be solved through more traditional approaches that are safe rather than through the development of vitamin enriched crops.

All civil society institutions felt it was important to establish systems for civil society involvement in policy development. Several key scientists

¹⁰³ Under whose authority the Board falls

supported this. One scientist engaged directly in biotechnology development noted that this was particularly important as 'farmers and consumers are the most vulnerable to biotechnology'. Yet, no civil society institution, as far as we could ascertain, had been involved in the development of the regulations or was represented on the Board. Again senior officials at the RCZ felt that civil society institutions were generally incapable of playing a meaningful role at board level given a lack of understanding of the science. Civil society institutions of course felt that what was key was not their lack of technical expertise but their ability to raise consumer, ethical and other concerns.

Another important focus is how responsible institutions make decisions and what provisions for accountability exist. It is felt that given the absence of rights to information and the virtually non-existent opportunity for the public to challenge decisions of the Biosafety Board there is a need for a watch dog organisation or some other independent mechanism. Given the recognition by a number of members of the board of multiple interests and the need for participatory processes, in practice more inclusive processes may eventually be adopted. All stakeholders see scientist-public communication as important. However there is a realisation that information can be provided in such a manner so as to support a particular perspective. Already there is a lack of trust and a concern that the 'whole story is not being told'. There is some public suspicion that the claim made by a scientist associated with the Biosafety Board that risk is minimal is improbable given the opposition amongst European consumers to genetically modified food.¹⁰⁴ The blanket denial, by some, that there is evidence indicating increased health risks from GM foods as a result of the transfer of genes from

¹⁰⁴ *Biotechnology*, 5:2, 2001, p 14

common allergens such as peanuts, fish, eggs and wheat and also from animal-feed that uses GM crops is treated with scepticism. A recurring problem is how to provide accurate information in an accessible form for a wide variety of actors, including resource poor farmers. The BTZ has sponsored the development of a multi-stakeholder/ expert/ interest association, the Biotechnology Association of Zimbabwe that seeks to promote debate around key issues. One commercial outfit said it would embark upon the education of farmers and consumers once the technology was adopted. The labelling of GMO products is seen as one possible method of communication with consumers that will create the basis for choice.

Rights to Genetic Resources and Community Intellectual Property Rights

The issue of access and rights to genetic resources has been a key area of debate in Zimbabwe and is often linked to opportunities for entrepreneurial development, economic empowerment and sustainable poverty alleviation. This section identifies the predominant perspectives and considers how actor networks have influenced approaches to policy and legal development.

This issue is seen as important for a couple of reasons. Firstly, because current legal regimes tend to ignore the contribution local communities and farmers have made to agricultural development and hence benefits are not shared. Secondly, because the recognition of products of biotechnology as novel and thus patentable could both reduce the potential benefits to resource poor farmers and developing countries and also increase their costs. A series of sub-issues arise including problems of bio-piracy, established intellectual property rights versus community

or farmer rights as well as the equitable sharing of benefits between developers of biotechnology and the original donors of the germplasm. Underlying the various perspectives is a tension between visions of genetic resources (and knowledge) as public and private goods. The issue of community rights is seen as important for a number of distinct reasons. Systems pertaining to the ownership of genetic resources are seen as key for the distribution of biotechnology products. Additionally, some development NGOs are concerned about the current trend towards concentrating control of the world's food supply (and medicines) in the hands of a few large corporations. Patents and constraints on use are seen to further exacerbate this trend. These intellectual property right (IPR) systems are believed to limit the ability of farmers to control how they use their seed – including the varieties of seed they plant, inter-cropping and the practice of saving, breeding and exchanging seed. There is concern that the control of seed distribution networks – particularly in the face of reports that Monsanto is a shareholder in SEEDCO – may reduce the choice of seeds and farmers may be forced to buy GM seeds.

Another concern is the lack of protection of local communities' proprietorship under the international legal regime. This, it is argued, allows large biotechnology corporations and scientists to exploit local technical knowledge without acknowledging and compensating for this contribution. For example, farmers' traditional varieties do not meet the UPOV criteria and are thus excluded from plant protection. Traditional varieties and landraces are characterised by high variability, high segregation overtime, and high adaptability; characteristics that make them ineligible for protection under plant breeders rights. This lack of protection is seen as a key factor in contributing to bio-piracy. From this

perspective there is a pressing need to establish systems for the equitable sharing of benefits not only between state parties but also within states. This involves redefining the relationship between state and community. Other key issues are participation and transparency in decision-making. These, it is argued, require that corresponding legal systems and rights be redressed – these include areas like tenure, access to information, issues of prior informed consent. NGOs argue that there is a tension between the benefit sharing type regime of the CBD and the focus on individual rights under TRIPS.¹⁰⁵

NGOs and others draw support for their approach to farmers' and community rights from the FAO regime and OAU model legislation. It is argued that local farming communities should be involved in the 'access determination process'. This requires their approval in a local prior informed consent (PIC) procedure and in determining the 'terms mutually agreed upon' of any contract relating to genetic resources they are or have been using. Benefit sharing systems must be achieved. Such benefits may be direct payments or royalties or indirect as restriction on exclusive IPRs, for example, in providing special conditions for farmers to using the final products of research and development based on such resources.

An important, but not widely canvassed, opinion is that IPR over living modified organisms will undermine research in developing countries and effectively deny farmers and other developers an important genetic base for further development. The implications of such protection may have dire consequences for farmers as is evident from Monsanto's action against Canadian farmer, Percy Schmeiser. In this case the farmer's

¹⁰⁵ See also discussion on the IUCN/ FAO/ COMMUTECH/CTD Model Legislation

crop was unintentionally modified by a neighbour's GM crop. The court found that he knew he had grown round-up canola and he had taken no action to remove it. Given their patent, Monsanto has an exclusive right to the crop. He was order to destroy the crop and no compensation was awarded for its modification.

Global NGO networks have been important in developing these approaches to community and farmer rights. Possibly the first initiative in this area was organised by ENDA Zimbabwe with collaboration from RAFI and Grain.¹⁰⁶ Subsequently a series of workshops and initiatives were held in this area primarily organised by the BRI in collaboration with the Community Technology Development Association (then COMMUTECH now CTD). The director of COMMUTECH is a former programme officer from ENDA Zimbabwe and chair of BTZ. Since then these bodies have remained consistent actors throughout the debate. Through this process COMMUTECH/CTD has effectively defined itself as the representative of development and resource poor farmers and has become the lead institution. It appears that other NGOs have been excluded, whether this is through design or accident is unknown. Despite this there has been an emphasis on developing a participatory process and a demonstrated commitment to achieving broad representation. Why and how other NGOs became less prominent is not clear. Issues that might effect a deliberate desire for exclusion include the desire to have access to the full pot of donor funding as well as differences between NGOs about representation and the inclusion of resource poor farmers. What is evident is that farmer interests have been 'represented' by NGOs and there has been no direct representation of resource poor farmers. Established farmers unions focus on

¹⁰⁶ Workshop on IPRs, Nyanga, 1992.

commercial and 'master farmers' respectively. Processes adopted have focused on national level discussion of key stakeholders as opposed to a broad locally based inclusive process. Consequently the link between local interests and national representation has been inadequately developed.

Interesting the process of discussing and building alliances around these issues have resulted in enduring co-operation between COMMUTECH/CTD and BRI. The key objective of these forums was the development of a national vision for developing 'Model Intellectual Property Rights and Patent Legislation for Zimbabwe'¹⁰⁷ that is in conformity with the international conventions the government signed and ratified and yet protects community interests. This effectively recognised a compromise position between development NGOs and local scientists. The joint workshops stressed the need for approaches to be consistent with the TRIPS agreement of WTO. The issue of intellectual property rights was clearly linked to community rights, systems of access and problems of bio-piracy. Issues of equity and ethics also emerged as key considerations. A key, and common, desire however was to ensure Zimbabwe is not just a testing ground but emerges as a player in the field of biotechnology.

Several sub-themes were identified in the consultation processes including the rights of traditional healers, women, farmers, communities and the reconciliation of research interests with these. There is also concern that these rights are linked to frameworks for rights created by the UNCED agreements and in particular the CBD. The CBD approach recognises that newly developed approaches must take into account

¹⁰⁷ Mushita, A (1996) 1

existing regimes. Consequently most locally based scientist have not felt threatened by the possible recognition of community rights or the strengthening of farmers' rights. What, however, emerged as a contentious issue was the patenting of life forms.¹⁰⁸ Surprisingly however key NGOs have not seriously or consistently engaged in getting to the bottom of this issue and contested whether or not the criteria of novelty have been adequately demonstrated in respect of genetically modified crops. Interestingly the Biosafety Guidelines accept that combining pre-existing genes may create novel inventions, and thus have been able to 'quietly' resolve this issue in favour of science. The alliance between development NGOs and scientist was essential based on the desire to creating systems and mechanisms for the sharing of benefits. Both local scientists and farmers groups perceive themselves to be potential beneficiaries and consequently there is little dispute about key issues to be addressed. Approaches to the sharing of benefits have been influenced by legal reviews and law development elsewhere. In particular law development in Costa Rica and the Philippines have been considered. International NGOs have also played a role in shaping approaches. For example an IUCN review undertaken by Glowka, became the basis for identifying what access agreements should address. Key issues, identified there, where (1) whether consent of the ultimate providers of genetic resources has been attained; (2) collection and export restriction including those based on the conservation status of the target organism; (3) research participation and publication; (4) provision of duplicate samples; (5) technology transfer; (6) royalties or fees; (7) ownership of samples, derivatives and associated knowledge or information; (8) intellectual property rights; (9) limits on third party transfer; (10) reporting and tracking requirements; (11) the term or

¹⁰⁸ Kadoma, 1998, workshop

duration of the agreement; (12) the terms for nullifying or rescinding the agreement; or (13) choice of law provisions and an contingencies when the agreement is breached.¹⁰⁹ At the regional level IUCN and FAO have supported a processes to develop models for sui generis legislation in response to the OAU model. In Zimbabwe NGO participation in this process seems to have been restricted to CTD.

Donors and large international NGOs, such as FAO and IUCN, have certainly influenced the form of debate and the content of policy initiatives, through funding regimes, defining or prioritising key issues or approaches including the identification of gaols in policy or regulation. They have also through funding promoted some institutions over others.

CONCLUSIONS

This final section summarises the key features of the framework for biotechnology policy development and the findings of the report. In conclusion it identifies some emerging concerns and issues that seem to be key to the policy process and may be essential considerations for developing processes that are inclusive of resource poor farmers and that result in widely accepted policies, regulations, approaches and institutions.

Zimbabwe's policy and legislative framework is generally supportive for the development of biotechnology. A receptive framework has been created for biotechnology in so far as proponents have been able to demonstrate that biotechnology presents real opportunities for Zimbabwe to address poverty and development concerns and this has been central to influencing the development of policy. In many respects

¹⁰⁹ Glowka 1998,

the Government looks to science for the resolution of key problems. So although one prong of the agricultural policy focuses on the issue of land reform a focus on the improvement of crops for the poor agro-ecological conditions of the communal areas is a priority. The focus on the role of science has been key in defining the legal space for research and field trials for GMO. Regulations define the circumstances under which research and field testing of GMOs may take place. The granting of applications for field testing of GM crops indicates that they are not intended to be over-restrictive. However, in practice, it seems that this might be a factor in why the private sector has chosen to run field trials elsewhere. Although the insecure conditions on commercial farms, which stem from the current land reform process, also seem to be key in influencing this choice. Similarly the foreign currency crisis and rules about its export no doubt are an important influence on private sector choice. Nevertheless, the current economic policy is geared towards encouraging investment but even this is now severely undermined by the ongoing political crisis.

The formulation of law is relatively transparent which creates a stable climate for private sector investment. The process does not support meaningful public participation. This might be viewed positively from a pro-biotechnology perspective as it limits 'public meddling'. However there are likely to be negative repercussions from this as it alienates key actors and thus may diminish the level of acceptance.

Several key features of the policy formulation process can be identified:

1. Given the economic reform process government spending in research has been drastically reduced; as a result of the current

economic and political crisis donor funding has been withdrawn. Consequently, the space and opportunity for private sector research and collaboration between academic/ public sector researchers and the private sector has been increased.

2. The notion of 'sound science' and the presentation of biotechnology as exclusively an issue of science has been the key factor determining both the form and approach of regulation and institutional development. It has effectively narrowed the space for engagement between scientists and civil society, developmentalists and farmers.
3. The NGO sector is relatively well developed. Broadly interested NGOs can be divided into two groups- those with a development focus and those with a rights focus. The influence of NGOs is evident in a number of key ways. Scientists have increasingly been forced to address development concerns. Some opportunity was created for public participation in the process of drafting regulations. Nevertheless, unlike in the environmental sector, NGOs have not been able to successfully, and collectively, determine the policy approach or ensure that regulations address their concerns.
4. The understanding of and approach to participation has been a key factor in shaping the policy process. The process of developing the Biosafety Regulations created windows for stakeholder participation. Yet at the end of the day the regulations do not reflect or directly address public concerns. The question arises why in a process that seems to create opportunity for participation is it possible to develop a product

that is so removed from public concerns. The nature of governance seems to underlie this. So although the space for contestation has seemingly increased the opportunity to influence debate and outcomes has not. This is because there are no significant ways in which the practice of decision making (and policy development) has changed. The shift to participation has not fundamentally challenged attitudes about authority or the relationship between state and society. Essentially the state remains unaccountable – so while it has heard opinion it is not obliged to use it in the policy process. Indeed the approach to participation mirrors this governance approach.

5. Resource poor farmers have largely been excluded from the formulation of regulation although many institutions claim to represent farmers' interests. In some instances resource poor farmers have supposedly been represented by the ZFU. It is not clear however to what extent the ZFU represents peasant farmers, as it tends to be an organisation of 'master' farmers. Nor is it clear to what the extent of individual farmer participates in the development of key policy positions of institutions that claim to represent them. This is true not only for the farmers' unions but also those NGOs with a resource poor farmer focus such as groups like BTZ, COMMUTECH/CTD, SALRED, AFFOREST. Similarly developers of biotechnology claim to be able to speak on behalf of farmers.
6. Inadequate communication has affected the policy process in two ways. Firstly, miscommunication is evident regarding the nature of the laws adopted. A case in point would be the

misrepresentation about the extent of protection offered to the public and public interests in the Biosafety Regulations. Secondly, methods and system for communicating with resource poor farmers in an accurate yet simplified about the nature of biotechnology and possible health, environmental and social ramifications has not been achieved. This failure in communication perpetuates the exclusion of resource poor farmers in policy- and regulation- making processes and prevents them from demanding adequate consideration of their interest.

7. There have been three broad responses by NGOs to the dominance of scientists in biotechnology policy formulation. Some NGOs have focussed on developing their own 'niches' within the debates. For example COMMUTECH/CTD has successfully directed processes around community rights and access to genetic resources. In some cases alliances may be based on such trade-offs. Others have disengaged and pursued separate processes to promote their interests. An example here is the consumer drive to have product control legislation. The final approach is to quietly engage in the dominant processes and try to influence the development of policy and projects in a way that addresses their concerns.
8. Approaches to managing or dealing with the uncertainty of the impact of GM crops are highly differentiated and can broadly be split into 'risk' and 'rights' approaches. Risk assessment approaches may themselves be split into two – those approaches that focus on science as a tool for measuring the extent of risk and those that use a multi-pronged approach to evaluating such

risk. The later group would also be concerned with risk to livelihoods and agricultural systems. The rights approach starting point is that development (including scientific development) must take into account human and other civil rights. These rights might include livelihood rights, rights of choice, health and environmental rights as well as cultural and religious rights.

9. Actor networks seem to be flexible – being reconstituted in respect of each issue or even sub issue. In some instances positions and roles appear to be the result of hidden tradeoffs between actors.

10. The relationship between the international realm and the national realm seems to be key in a number of ways:
 - Access to resources, and in particular donor funding, seems to contribute to the development of 'policy elites'. It also appears to be used to exclude certain groups or individuals from key debates. Partnerships with international NGOs are important for gaining access to resources.
 - Global legal processes, and partnerships with international organisations, influence the identification of policy gaps and approaches.
 - Globalisation, and in particular Zimbabwe's membership of the WTO, are key considerations in placing restrictions on economic activities and unfolding policy.

11. The relationship between the local and national level in the policy process is poorly developed. Farmer and community interests have typically been represented by NGOs however in the absence

of systems of accountability it is unlikely that these relationships are based on partnership or representation. Instead they seem to be donor, broker or client based.

12. The institutional framework in Zimbabwe is characterised by a high level of interconnectedness between institutions and actors. This is particularly striking in the biotechnology field given the relatively small number of actors. Additionally key individuals may be associated with two or more institutions. Consequently the potential for conflict of interest in policy making, regulation, monitoring and enforcing is high.

13. Inter-ministerial co-operation is poorly developed.

Competition between ministries for scarce resources seems to be a key factor. In some instances there seems to be a level of hostility between the parties – as is indicated by the (silent) dispute about what ministry should have general authority over biosafety. The sidelining of other ministries may also be a result of a desire by researchers to retain control. It is unclear why other ministries have allowed this to happen. The attitude of others seems to be to focus on their own strengths. The Ministry of Agriculture, given difficulties of funding and capacity, seems to be focussed on conventional breeding.

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