

**FANRPAN ECONOMIC POLICY RESEARCH  
STUDY ON STATUS OF PLANT VARIETY  
PROTECTION IN THE SADC REGION**

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MALAWI, MOZAMBIQUE, ZAMBIA AND ZIMBABWE**

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## ACRONYMS

ARC= Agricultural Research Council (South Africa)

ARIPO= Africa Regional Intellectual Property Office

CBD= Convention on Biological Diversity

CGIAR= Consultative Group for International Agricultural Research

CSIR= Council for Scientific and Industrial Research (South Africa)

EDV= Essentially Derived Variety

EU= European Union

FANRPAN= Food, Agriculture and Natural Resources Policy Analysis Network

GM / GMO= Genetically Modified / Genetically Modified Organism

IK / IKS= Indigenous (Traditional) Knowledge / IK Systems

IP / IPR= Intellectual Property / Intellectual Property Rights

ITPGRFFA= (FAO) International Treaty on Plant Genetic Resources for Food and Agriculture

MTA= Material Transfer Agreement

OAPI= African Organization for Intellectual Property

OP= Open-pollinated (variety)

PBR= Plant Breeders' Right

PVP= Plant Variety Protection

SADC= Southern Africa Development Community

SAGIC= S A Green Industries Council

SANBI= South African Biodiversity Institute

SANSOR= South African National Seed Organization

SGASA= South African Seedling Growers Association

TRALAC= Trade Law Centre for Southern Africa

UPOV= Union for the Protection of New Plant Varieties

US= United States

WIPO= World Intellectual Property Organization

WIPO-IGG= WIPO-Inter-Governmental Group on Intellectual Property, Traditional Knowledge, Genetic Resources, and Folklore

WTO= World Trade Organization

WTO-TRIPS= WTO-Trade Related Intellectual Property Systems

ZAR= South African Rand (currency)

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Pretoria, South Africa, 18 December 2005

## EXECUTIVE SUMMARY

This study into plant variety protection systems in target SADC countries, commissioned by FANRPAN, has as basic objective to establish an overview of status of legal protection of ownership of plant varieties, and experience, benefits and deficiencies in these systems. It was also attempted to quantify impact of adoption or non-adoption of plant variety protection systems. This review will serve as discussion document to develop policy proposals for SADC member states to comply with WTO-TRIPS and to find ways to assist members in the process.

The approach was to access regional and international documents, and to obtain update information by way of personal interviews and visits to relevant parties in South Africa, Malawi, Zambia, Zimbabwe and Mozambique. Information on Angola was sourced by way of e-mails. South Africa has had patent and trade mark legislation for a long time, and became UPOV member in 1978, and has also made extensive use of contracts and licensing. Also, it was easier to source South African information as the author has extensive personal contacts that provided collaboration, while government information could be obtained from websites. Therefore, much of the statistical contents of this review relates to South Africa.

The focus of the study was on plant breeders' rights but opportunities in patents, trade marks, contracts/licensing and geographic indications are also covered. New plant varieties are eligible for intellectual property protection under plant breeders' rights provided in the UPOV convention, while protection also is available for patents on processes and products that involve innovative steps that are not natural biological processes. A plant variety per se is not patentable, but micro-organisms are eligible. Trade marks can be applied for special traits associated with plants, but such marks cannot be used as variety names. Contracts and licensing agreements are often used to allocate rights for production and marketing of varieties exclusively to one or a few parties. The potential for using geographic indications for varieties and their products having special values associated with their geographic origins, has as yet not been exploited. New attention is being focused at national and international levels on protection of land races and farmer varieties, as well as indigenous community knowledge associated with plants.

Several SADC countries have made use of contract production for cut flower exports, and of licensing agreements for national production and marketing of varieties. South Africa has made extensive use of PBR, trade marks on a few plant species, and patents on modern plant biotechnology. The system for licensing agreements for testing, seed production and marketing has been successfully used for public varieties released by the Agricultural Research Council. Seed varieties have been licensed via SANSOR and deciduous fruit trees through SAPO, while other species were handled directly or through nurseries and producer associations. Use of geographic indications and beneficiation on indigenous food crops remain unexploited in SADC. There is a growing awareness that public institutions also need to adopt IPR systems in order to add value to their research, control market introduction, maintain genetic integrity, and generate funds through royalties. Presently, public institutions make some use of material transfer agreements.

One objective of IPR studies of this nature is to evaluate the quantifiable impact that IP protection has had. All such previous studies had some difficulty to separate the effect of several factors, namely, a conducive government policy and regulatory framework for plant variety introduction, access to international germplasm, the opportunity to breed or introduce new varieties of OPs to extend product range of an enterprise, domestic or international market opportunities for varieties having specific traits, size of the agricultural industry, and availability and effectiveness of legal protection for breeders of new varieties. In SADC only Zimbabwe and South Africa have had long experience with PBR, which limits comparisons.

Botswana, Lesotho, and Swaziland, all having no PBR legislation or drafts, have between 2 and five active seed companies, from zero to 45 varieties on official lists, no plant breeding companies, and only Swaziland having five parties doing field trials

Angola and Namibia have started with a first PBR draft and have four and five seed companies, respectively, 7 to 40 varieties on lists, only government doing breeding, while only Angola has some 6 parties doing trials

Countries with advanced or final PBR drafts include the DRC, Mauritius, Mozambique, Zambia, Tanzania, and Malawi, and the number of seed companies ranged from two to 15, while the number of varieties on official lists ranged from 20 to 200, breeding companies go from zero to 7, and from two to 15 companies do trials.

Only Zimbabwe and South Africa have had PBR since the mid 1960s and varieties with PBR are some 50 in Zimbabwe and 1807 in South Africa. Number of active seed companies are 20 plus, listed varieties 214, breeding companies 11 parties, in Zimbabwe, while South Africa has 65 active companies, 1978 PBR varieties, and 22 companies, over 4 universities and 9 public institutions involved in plant breeding. An estimated total of 300 plus varieties are available to Zimbabwean farmers and 3500 plus to South Africans. Zimbabwe has a major seed industry, while the South African industry has a turnover of over \$334 per year, the biggest in Africa. The latter includes exports worth about \$80 million.

Many of the 3500 South African varieties are on official variety lists, while others are on industry lists, or unlisted. Since 1978 plant breeders' rights on new varieties have continued to grow and stood at 1807 varieties by end 2004. Some 39 per cent of these belong to South African private and public breeding institutions. Per crop group these PBRs number 236 varieties for 17 species of vegetables, 774 for 67 ornamental/flower species, 244 for 28 fruit species, 442 for 24 agronomic species, and 111 for 23 forage and pasture species.

Other PVP impacts that are not easy to quantify include:

**Financial benefits:** No data are available from country reports and feed-back, but some direct and indirect information is useful. Liberalization of seed industries lead to entry by private companies that have brought investment, as has happened in most SADC member states. The South African seed industry was driven by local companies and co-ops until the mid 1950s. Major foreign investment of tens of millions of dollars gained momentum during the last 15 years, bringing also advanced

technologies and germplasm. IPR is an important pre-requisite for almost all companies before they invest.

**Crop production efficiency:** Plant breeding and access to improved varieties generally lead to increased yields per hectare. Average South African maize yields per hectare increase over five-fold, and wheat almost five-fold, from 1950 to 2005. Plant variety protection, though not quantifiable, strengthens investment in breeding.

**Benefits for farmers:** The farmer is generally the major beneficiary of improved varieties. In 1994 the added farmer benefit of increased South African maize yields due to breeding was estimated at \$200 million per year. Locally bred peach, plum and apricot varieties protected under PBR contributed \$160 to exports in 1993. The introduction of the protected Australian apple, Pink Lady, added direct profits of \$10 million for farmers. In Zimbabwe, Zambia, Uganda and Kenya farmers benefit from export of cut flowers, all controlled under strict contracts. More opportunities can arise if protection is strengthened by PBR.

**Export earnings:** Most SADC countries can benefit from producing and exporting seed. Zambia has been exporting several thousand tons of seed in 2005, Zimbabwe has a long track record as a major exporter, and South Africa exported over 21 000 tons worth an estimated ZAR500 million (\$80 million) in 2004. Most companies will not sell new varieties, or have seed produced, in countries where there is a danger of alienation of proprietary varieties. Biotech companies will not make available GM seed for testing or sales unless importing countries have biosafety systems and IPR in place. The potential for producing off-season seed for the northern hemisphere and for regional trade is substantial.

Although available data do not enable an adequate empirical analysis of the direct beneficial impact of plant variety protection systems, it is clear that PVR remains a major factor. The South African fruit industry is adamant that their multi-billion dollar exports are based on improved varieties and that access to these is underpinned by PVP. Breeders generally agree that PVP boosts investment in breeding. Seed companies interviewed have a policy that they will rarely make available seed of proprietary OP or self-pollinated varieties for testing and marketing in countries that do not provide protection. Therefore, even though breeding and marketing of new varieties require an enabling regulatory environment, it is the presence of efficient IPR that is a key factor in such development.

Recommendations can be summarized as follows:

1. The message should be conveyed to senior policy makers and politicians that, although compliance with WTO-TRIPS requires an effective IPR legal system for plant varieties, it is in the interest of member states to protect their own innovations, plant genetic resources and community rights under legal systems, while improving access to new, improved varieties. Furthermore, that providing legal protection will stimulate further research, development and innovation, with concomitant benefits for the economy, while African varieties and indigenous food crops will remain be protected against piracy.
2. While it is necessary to make provision for farmers' rights as required under the CBD, and for indigenous knowledge, these systems of protection rest on different legal bases and should be handled separately. At the same time one cannot strengthen one system of protection by weakening another. It should be acceptable that disclosure of use of farmer varieties,

land races and indigenous knowledge in IP applications will strengthen benefit sharing.

3. Requirements for production, certification and marketing are matters falling under seed trade regulation and management, and should not form part of requirements for IPR but can be handled separately.
4. It is recommended that plant breeders' rights be modelled after the UPOV system as some 100 countries individually or as members of regional blocks such as OAPI and the EU that have adopted this model. There is no reason why SADC should develop systems that are at variance with those of the rest of the world.
5. UPOV presents a global harmonized *sui generis* protection that dictates that convention members must extend the same protection to other members. It would be against this trend if SADC members develop PBR laws that are not harmonized regionally and internationally.
6. Patent legislation should be modernized to include reference to plants and should harmonize with existing laws in most countries, while Trade Mark legislation should qualify that marks are eligible for protection, as long as such marks are not used as variety names.
7. Provision for protection of land races, farmer selections and community/indigenous knowledge can only be implemented if documented and if plant selections are collected, described, catalogued, and maintained in gene banks. Where ownership is uncertain, government should act as custodian.
8. It is proposed that a task team be established to collaborate with ARIPO in assisting national governments to expedite the legal process. At the same time such a task team can assist with capacity building in regulators, as well as public and private breeders. Ideally, ARIPO could be the regional secretariat to manage PBR, as in the case of OAPI. Especially important is the fact that a regional registrar (such as ARIPO) will significantly reduce UPOV membership fees impact for SADC.

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**PREAMBLE**

This study on Plant Variety Protection (PVP) systems in select SADC member states, conducted under contract with FANRPAN, was intended to analyze the experience over 25 years with PVP and its present regulatory status. A background of international conventions and agreements is given and explanations provided of requirements for different types of PVP. Although the FANRPAN focus is to a large extent on seed crops, much information was obtained from fresh produce industry sectors and the successes that they have experienced.

The modus operandi used was, firstly, to obtain local and international statistics and documents for analysis; secondly, to have meetings with relevant government departments (Trade & Industry, Science & Technology, and Agriculture); thirdly, to gain information from industry sectors and their plant breeders, based on a set of discussion points handled by way of personal meetings, telephonic interviews and e-mail responses; and, fourthly, to access various review documents and articles in order to develop some recommendations for SADC. Valuable additional information was conveyed by participants in the PVP workshop held in Lusaka, Zambia, on November 21-25, 2005.

## INTRODUCTION

Progress in society has largely been based upon innovation through intellectual creativity. Protection of such creativity has long ago been awarded to the innovator. It is more than a reward for deriving benefits for the innovator; it is also to stimulate and provide incentives for investment in innovation, as well as providing ongoing benefits for society. In general, such protection requires proof of ownership, novelty, an innovative step, disclosure/documentation, and increasingly, expectation that such innovation has some useful application.

Intellectual property rights are in harmony with Article 27 of the Universal Declaration of Human Rights, namely, that *“it guarantees everyone’s right to the protection of moral and material interests resulting from any scientific, literary or artistic production of which he is the author”*.

For many years the approach has been based upon industrial principles but in the last few decades it became apparent that there is some intellectual property that does not meet the requirements of novelty, documentation and ownership, and, specifically, for traditional artwork, music, land races, and knowledge in the historic public domain.

## GLOBAL ARENA

Globalization has come to stay, bringing with it opportunities, threats, and disputes. It has removed isolation and increased the North/South or industrial vs. developing countries conflict. A strong focus has emerged on natural resources, especially biological diversity. Further complications arise from growing consumerism and ongoing trade protectionism and barriers. New developments include a search for a balance between IPR and access to pharmaceuticals, biotechnology transfer, economic activities, small companies, genetic resources, traditional knowledge, folklore, etc.

It is against this background that intellectual property rights need to be assessed in a balanced manner.

***The World Intellectual Property Organization:*** WIPO is the global body to oversee IPR systems aimed at promoting and protecting works of human endeavour, such as science, technology and arts. The need for a global body was identified in 1873 and WIPO was established in 1883. More recently WIPO became one of the 16 specialist agencies of the UN. It presently administers 23 international treaties dealing with different aspects of IPR, and it has 179 nations as member states. The most important treaties are the Patent Law Treaty and the Patent Cooperation Treaty. WIPO’s annual budget is SWF 678 million. Recently, WIPO established a working group to consider modalities for protection systems for indigenous knowledge and community rights.

Various national, regional and continental intellectual property offices operate under the WIPO umbrella.

- USPTO: United States Patent and Trademark Office

- EPO: The European Property Office serves to coordinate IPR in the European Community.
- OAPI: The African Organization for Intellectual Property (primarily for Francophone states).
- ARIPO: The African Regional Intellectual Property Organization for Southern Africa (primarily for Anglophone states)
- UPOV: The Union for the Protection of New Plant Varieties

**ARIPO** is of special importance to SADC as it was established to pool IPR resources in Anglophone African countries, harmonize laws, provide common services and assist its members. ARIPO came into force in 1978 following the Lusaka Agreement in 1976. The Harare Protocol of 1982 enabled ARIPO to receive and process patent and industrial design applications of member states, a function that subsequently led to creating a link with the international Patent Cooperation Treaty. This was extended to trade marks when the Banjul Protocol was adopted in 1993. Current membership is 16 countries that include Botswana, Lesotho, Malawi, Mozambique, Namibia, Swaziland, Tanzania, Zambia, and Zimbabwe in SADC. ARIPO also collaborates with non-members like Angola, Mauritius, South Africa, and others.

It is noteworthy that the key objective of ARIPO is that cooperation is intended to achieve technological advancement for economic and industrial development of member states.

**The World Trade Organization:** WTO has a mission to facilitate global trade by reducing trade barriers. Article 27 of the TRIPs Agreement requires that “*patents shall be available for any inventions, whether products or processes, in all fields of technology, provided that they are new, involve an innovative step, and are capable of industrial application.*” Paragraph 27.3.b states that: “*members shall provide for the protection of plant varieties either by patents or by an effective sui generis system, or by a combination thereof*”. The same paragraph also provides that members may exclude for patent eligibility “*plants and animals other than micro-organisms, and essentially biological processes for the production of plants and animals, other than non-biological and micro-biological processes*”. It is in practice only the US (and by exception Australia and Japan) that award patent rights on plant varieties. The *sui generis* option means a protection system “of its own kind” which provides a flexible approach.

**The Convention on Biological Diversity:** The CBD was established to protect biodiversity as humankind’s heritage, giving custodianship over biodiversity to national governments. Its mission is three-fold: to ensure conservation of biodiversity, the sustainable use thereof, and the equitable sharing of benefits resulting from such use. The main obligations under the Convention include access to biological resources by prior informed consent, protection of the rights of communities, farmers and indigenous peoples in respect of resources and traditional knowledge.

**International Treaty on Plant Genetic Resources for Food and Agriculture:** The ITPGRFA arose from the FAO-International Undertaking on access to varieties and germplasm in the public domain such as those at the CGIAR research institutes. The Undertaking ensured that recipients of such material would not take out IPR, unless significant further selection/breeding was done. The Treaty now links conservation,

IPR, sustainable agriculture and food security, and covers rights of farmers and indigenous knowledge. The Treaty applies to a list of plant species and many crops of importance for Africa are not on the list.

***The Union for the Protection of New Plant Varieties:*** The UPOV Convention was established in Paris in 1961, came into force in 1968 and was revised in 1972, 1978 and 1991. It sets a global regime for protecting the ownership rights of plant breeders for varieties that are new, distinct, uniform, stable and have an acceptable denomination. Its mission is to manage a harmonized system that will promote the development of new plant varieties for the benefit of society. The status of UPOV membership on 29 June 2005 stood at 58 member states with the European Union having acceded as a block (some 22 states). The 16 states from West Africa have a PVP system almost identical to that of UPOV known as the Accord de Bangui. Other developing countries are in the process of joining. Over 100 countries have laws or drafts based on UPOV. It is noteworthy that only South Africa (1978), Kenya (1999) Tunisia (2003), and Morocco (2005) are UPOV members, whereas the Latin American subcontinent with much fewer states than Africa, has 12 UPOV members.

UPOV 1991 revision extended protection to all genera and species, extended the period of protection, included an article on farm-saved seed, and incorporated a new concept of essentially derived varieties.

One objective of this study was to try and quantify some measurable impacts for countries with PVP systems. In this study impact analysis was constrained by the fact that only Zimbabwe (where a list of PBR varieties could not be obtained) and South Africa have PBR laws. Analysis of impact, as found by many other researchers, could also not be isolated from other factors such as a liberalized regulatory seed trade environment, company need to extend product range, enforcement of protection, access to germplasm, and farming practices to improve production efficiency.

IPR impact is determined the type of legal protection and the strength of its enforcement. Jaffe and Van Wijk (1995) experienced inadequate empirical data in a study on five Latin American countries, but concluded that PBR assisted private companies not to scale down or terminate breeding OP crops, that PBR enhanced strategic value of germplasm for both public and private breeders, that it enhanced collaboration between national and multinational companies, but that licensing often restricted marketing opportunities. No negative effects were found on seed price, but impact of PBR was different from that of patents. Lesser (2002) found that IPR was strongly correlated with direct foreign investment. Kesan (2005) reported that PBR boosted breeding and access to improved soybean varieties in Argentina, leading to 6.7-fold increase in area planted and 14-fold increase in total yield from 1978 to 2004. However, PBR being a weak IPR system, lead to extensive farm-saved seed practices that resulted in Monsanto withdrawing in 2004. As result new soybean variety registration in Argentina dropped, whereas registrations increased in the US where both PBR and strong patent protection are in force. Maredia (1999) reported that the Michigan State University policy of patenting brought in \$20 million from royalties on pharmaceutical products, that it aided further innovation by MSU and others, that it helped to control licensing and marketing, and that it facilitated establishment of private start-up companies. Other analysts reported a direct relation between PVP adoption and increase in crop yields.

This study attempted to look at PVP impact by collating information on status of PVP against numbers of varieties, breeders, private companies, companies doing variety trials (Table 1, Annex I), and, where possible, financial outcomes.

# TYPES OF PLANT VARIETY PROTECTION

## Patent Rights

- Exclusive rights are granted for an invention which is non-obvious, new and useful. The US Plant Patents Act of 1930 provides for patents on asexually propagated plant varieties and that a patent will cover all components of a plant. Patents can also be taken out on certain plant biotechnology innovations. Japan and Australia grant patents on plant varieties only under exceptional circumstances. US utility patents for sexually propagated varieties, hybrids and tuber propagated species require that a claim for utility value has to be specific, substantial and credible. Utility patents are more stringent than plant patents.
- Protection covers production, use, distribution and sale of patented/invention which require owners' consent. The protection usually expires after 20 years after filing application and protection is granted while examination is pending.
- The owner can license, sell or authorize use of his invention.
- Patent owners must publicly disclose sufficient details of their invention so as to enable a reasonably trained person to produce the invention. Disclosure must be written and explain best mode of using invention and enablement.
- Application for patents requires furnishing details of the technical field, background and description of the invention. Material has to be deposited. The extent of the protection depends upon the range of the claims made.
- Patents are generally granted per country but could be awarded per region such as the EU.
- The US considers that protection extends to all components of the patented plant variety. Therefore, there is no breeders' exemption and one may not use a patented variety for further breeding, but companies may sometimes make informal exemption. The EU has not clarified this issue, neither has South Africa. The International Seed Federation has an official position that it supports extension of the breeders' privilege to patented varieties but without freedom to use the patented trait. The US requires that usefulness must be specific, substantial and credible. The EU allows broad eligibility but identifies certain patents as not having industrial application.

## Trade Marks

- WTO Article 15 defines a trade mark as "a distinctive design, or combination of signs, capable of distinguishing the goods of one undertaking from those of other undertakings, shall be capable of constituting a Trade Mark".
- Protection ensures exclusive right to use the mark to identify goods or services.
- A trade mark can be words, letters, numbers, drawings, etc., or combination thereof.
- Application for a distinctive mark must be filed with a national or regional office, and the latter will launch a search and examination.

- Protection is enforced by courts and the registration office maintains a register. Protection is limited to the country or region. Registration must be renewed periodically.
- A trade mark cannot be used directly as a variety name

## **Plant Breeders' Rights**

Under the UPOV Convention protection of plant varieties is granted if the variety is new, i.e. not known in the market for over 1 year in country developed or over 4 years (6 for trees/fruit) in other convention country, distinguishable in terms of botanical description from another known varieties, sufficiently uniform in appearance, and stable over cycles of propagation or multiplication, and have an acceptable denomination (name). Other salient requirements are

- All species on official lists are eligible (extended in 1991 to all plant species)
- Applications are made per country or region
- The government shall examine the documentation and may grow out plants for examination
- Protection covers production, offering for sale, marketing, imports, exports, of the propagating material. UPOV 1991 extends protection to harvested products of the variety in cases of unauthorized use of the propagating material.
- The protection period shall be at least 15 years for seed crops and 20 years for tree and vine species (extended to 20 and 25 years under 1991)
- The rights of the breeder shall not extend to further breeding by others
- A member state of the Convention must extend same rights to other member states

The 1991 revision of UPOV also clarified and/or added the following aspects:

- Article 14.5 extends protection to essentially derived varieties i.e. new varieties derived from, but distinguishable from, initial protected varieties, when the derived variety retains the essential characteristics (i.e. genetics) of the initial variety.
- Article 15.1 states compulsory exceptions from protection as acts done for private and non-commercial purposes, experimental acts, and further breeding (subject to Article 14.5).
- Article 15.2 defines that within reasonable limits, subject to safeguarding the legitimate interests of the breeder, a farmer may use for propagating purposes on their own holdings, harvested material from a protected variety planted on their own holdings.

The US Plant Variety Protection Act of 1970, updated in 1994 to meet UPOV 91, applies to sexually propagated plants, hybrids, and tuber propagated varieties.

## **Contracts/licensing/royalties**

Independent of protection granted on plant varieties by patents, trade marks or plant breeders' rights, the owner of the variety has freedom to enter into contractual arrangements with one or more other parties for the production or marketing of

propagating material or products derived from it. These could cover production of foundation/basic seed or planting material, commercial seed or products such as tubers, fruit or flowers. The price of material provided can be negotiated between the parties and contracts may involve specific geographic territories or regions. It may include official quality certification, may limit the area or number of plants to be grown, and may define the territories or markets where the resultant products produced may be sold. Royalties and/or technology fees may be levied on the seed or propagating material provided, or on the products sold (flowers or fruit).

One useful way of retaining control of biological material released by owners or custodians of such material in the public domain, is Material Transfer Agreements (MTA), as provided for in the International Treaty on Plant Genetic Resources. The MTA agreement would include details of the parties concerned and the material released and conditions imposed upon the recipient of public material would include

- that the recipient would not take out IPR on material in the form in which it had been received
- that the material and its progenies and derivatives would be used for non-commercial purposes and, if commercial use is envisaged, prior approval has to be obtained from the supplier
- that any benefits accruing from the material or its progenies or derivatives would be shared equitably with the supplier, and
- that the material would not be transferred to other parties without approval by the supplier.

An MTA, in fact, constitutes a formal contract with which both parties have to comply.

Some biotechnology companies require farmers to sign a contract stipulating that the farmer shall not retain harvested material of genetically modified (GM) crops for re-planting or selling. The basic reasons for such contracts are that it

- enables the technology owner to obtain royalties or technology fee payments
- ensures variety integrity of the variety as it will be very difficult to manage herbicide or pest control practices when varieties become mixed
- prevents loss of control over varieties that will make identity preserved production difficult
- enables the seed company to comply with government requirements to monitor the crops, refuge plantings and potential insect or pest resistance occurring

These restrictive contracts on seed sold are sometimes used by companies selling conventional seed. It seems that this mechanism of protection is not well received by some farmers and may have little practical impact.

Article 31 of WTO-TRIPS provides that, under exceptional circumstances, compulsory licences may have to be granted by the holder of IPR to third parties. These include refusal to deal by the holder, emergencies and extreme urgency, public non-commercial use, anti-competitive practices, and patent dependency. Such compulsory licences do not take away patent rights, but will restrict rights.

### **Indigenous/traditional knowledge systems (IKS)**

The CBD requires that historic contribution of farmers and communities to biodiversity be recognized and that benefits derived from biodiversity be shared with those that historically have made and presently still make such contributions. The CBD defines IKS as “knowledge, innovations and practices of indigenous and local communities, embodying traditional lifestyles” and also includes “indigenous and local technologies”. These contributions include knowledge of plants, health and agriculture. Historic knowledge is often in the public domain and its application encounters difficulties in qualifying for ownership, novelty, innovation steps, and documentation, as required under industrial types of IPR regimes. WIPO has established an Intergovernmental Committee on Intellectual Property, Traditional Knowledge, Genetic Resources, and Folklore (WIPO-IGC) to develop modalities for protection of such intellectual property. WIPO uses a broader definition, namely “tradition-based literary, artistic and scientific performances; designs, marks, names, symbols; undisclosed information; and all other innovations and creations”. IKS are grouped into two broad classes: biodiversity-related IKS and arts and crafts IKS. The first covers various categories that include agriculture, ecology, biodiversity, and medicinal knowledge.

### **Geographic Indications**

Plant products, and perhaps types of plants, may be protected under geographic indications and these are governed globally under the 1891 Madrid Agreement for the Repression of False and Deceptive Indications of Source, and under the 1979 Lisbon Agreement for the Protection of Appellations of Origin and their International Registration. Such indications identify goods originating from a territory where given qualities and reputations are attributable to their geographic origin. This form of protection will not be covered in this review.

### **Confidential Company/Institution Information**

This component of variety protection is an indirect method to prevent confidential information from being made available to competitors or the public and may comprise knowledge of hybrid pedigrees, inbred lines, research methodologies, sales figures, financial data, etc., as well as to ensure that employees do not pirate varieties. It is normal practice for private companies, public research and academic institutions to require that employees sign an employment undertaking that (a) all intellectual property shall belong to the employer, and (b) that they shall not divulge any confidential information to any other party. The other side of this issue is that employees have a democratic right to use their intellectual expertise to pursue a career at another employer. Between these two sides, there are some grey areas such as restraining agreements. This study shall not cover the issue of confidentiality but breeders and employers should be aware of their respective rights and constraints.

## **ANGOLA OVERVIEW**

No personal visit was paid to Angola due to time and cost constraints, as well as known delays in getting a visa, and the probable limited progress on legal PVP systems. The information summarized below was obtained through e-mails and phone calls, and presentations at the Lusaka PVP workshop.

- Angola appears not to be a signatory to relevant IPR Agreements
- Angola has passed a Seeds Law in May 2005 to regulate production and commercialization of seed and vegetable materials. Drafting of regulations by the Ministry of Agriculture and Rural Development is in process with assistance from the FAO
- The first draft of a PBR law has been developed by a plant breeding teacher at the university. It is recognized by government that PBR legislation is needed
- A variety registration committee is being set up for compiling official variety lists from the existing lists developed by Seed Services. Requirements will include two years of tests by the national agricultural institute IIA, pre-release trials on-farm, farmers in communities must select desirable varieties, and the variety owner must show that breeder seed will be maintained for seed production. Private varieties are included in government variety trials
- Following listing of varieties there are no other restrictions in production or sale of seeds to the farmer. There are as yet no official variety lists but an unofficial list of some 40 varieties has been compiled to start the process.
- Presently government is the only party involved in plant breeding. Since 5 years ago private companies (SeedCo, Pioneer, Pannar, Monsanto) have commenced seed marketing but little variety testing is done by them and no plant breeding. Some local seed production was done by SeedCo in 2005. Cotton companies have started variety testing.
- Angola is looking at all components dealing with benefit sharing under the CBD
- The Patents Act of 1990 does not make provision for plants or plant varieties as it is an industrial type of IPR, and needs to be updated
- Angola does not have Trade Marks legislation that covers plants or special characteristics
- The only present plant protection resides in the FAO plant genetic resources agreement (the IT-PGRFFA)
- The Angolan government has taken very few steps as yet to comply with WTO-TRIPS
- IPR legislation needs to be updated and personnel trained in developing such legislation.

## **BOTSWANA OVERVIEW**

The status of the seed industry and variety protection can be summarized as follows:

- The Patents and Innovations (?) Act is fairly up to date, as is the Copyright and Labelling Act

- Folklore is covered under the Trade Marks Act
- There is as yet no Plant Breeders' Rights Act
- The seed supply trade is dominated by government with SeedCo also playing a role. Government has a seed production unit that makes extensive use of contracted farmer seed growers (also called seed providers) of which only a small portion farm under good rainfall conditions. There are some 57 such seed producers. Government generally makes seed available free to small holder farmers whose farms are about 3-7 hectares each. There are also some larger commercial farms of up to 100 hectares.
- There are no official variety lists but research staff keep their own lists

## **DEMOCRATIC REPUBLIC OF THE CONGO OVERVIEW**

Crop production takes place in three agro-ecological regions: highlands at 1000-1500m in the South-East, highlands at 1500-3000m in the North-East, and equatorial lowlands at 200-800m. Major food crops in the latter are cassava, maize and banana. The DRC has a draft seeds law that incorporates a chapter on plant breeders' rights.

There is a variety list and DUS tests are carried out by the National Seed Services. More than 20 improved varieties of rice, maize, groundnut, cowpea, soyabean, and dry beans are available to farmers. Sorghum and millets are mostly land races.

All companies involved in seed production and marketing are DRC companies. All crop breeding is done by public institutions like INERA, university and CRM, the maize research centre. There are smaller programmes on potato, sweet potato, and rice. The DRC collaborates with CG institutes like IITA on banana, cassava, soyabeans and cowpeas, ICRISAT, CIMMYT, CIP and CIAT. Varieties, advanced populations and inbred lines are screened and selected. Yugoslavian maize material has been used with success. Some wheat is grown in the North.

Draft legislation comprises seeds law and PBR as annex but has not yet passed through Parliament. A variety catalogue has been set up and Seed Services is conducting DUS tests on new varieties.

## **LESOTHO OVERVIEW**

Lesotho has a Registrar of Intellectual Property Rights in the law office but no PBR legislation. No plant breeding is done but variety testing takes place. Seed production involves mostly Irish potato. Seed supplies are readily accessible from private companies such as Agricol, Pannar, Monsanto, and from government.

There is a national seed policy but legislation has not yet been passed. There are no official variety lists or seed catalogues. Development of a seed legislative framework could be encouraged by way of sharing of information by SADC member countries.

## **MADAGASCAR OVERVIEW**

No information has been supplied.

## **MALAWI OVERVIEW**

The Malawian Seed industry was strictly managed under the Ministry of Agriculture until about 1970 with Admarc serving as main seed distributor for seeds like maize OPs and hybrids. The onset of liberalization saw private seed companies enter the market in the 1970s and selling public, CGIAR and their own varieties but preferring to have exclusive rights to new public releases. The recently established Seed Trade Association of Malawi now has membership that includes Pannar, SeedCo, Pioneer, Monsanto and two Associations of Smallholder Farmers (one for grains and one for legumes). There are also two NGOs (World Vision and Concern Universal) involved in the seed industry, apart from the Malawian government through its public varieties.

All new varieties must go through a variety release system that requires two trials over three seasons, followed by application for listing with the results going to the Variety Release Committee comprised of representatives from Seed Services, smallholder farmers, the University, extension services, and the Crops Department of the Ministry. Private, public and CGIAR varieties all have to follow this procedure. These variety lists apply to major crops like maize (6 hybrids and 9 OPs), sorghum (7 OPs), Cassava (7), Sweet potato (10), Soya (13), Cotton (8), Sunflower (5), Cowpeas (2), Pigeon peas (3), Beans (17), Groundnuts (11), Rice (4), and Pearl millet (2). This brings the total of officially listed varieties to 104. Seed certification according to OECD standards is mandatory for all listed, imported and locally produced varieties.

Public breeding takes place at national centres for cotton, maize, rice, and vegetables and are released to all parties. Seed companies are showing less enthusiasm for this arrangement. Release of CGIAR (CIAT, ICRISAT, and CIMMYT) varieties for testing is based essentially on MTA agreements on a non-exclusive basis and a non-multiplication requirement.

The Malawian IPR system is presently undergoing coordination and policy development as much of existing legislation is outdated. There is no mention in the Patents Act of plant varieties, while the Trade Marks Act states that trade marks cannot be used as variety names. WIPO and ARIPO are rendering assistance. Different institutions are handling different issues with patents, trade marks and copyrights resorting under the Registrar General in Blantyre. A draft Plant Breeders' Rights Bill is presently with the Justice Department. Issues receiving attention by the National Research Council include procedures for accessing plant genetic resources for which MTA type agreements are being drafted for specific categories of objectives such as academic or commercial, and the aspect of use of indigenous knowledge that will be anchored in registration of IPRs. This development must link into the national science and technology policy which is not yet in place and will incorporate benefit sharing, especially as regards use of medicinal plants. A draft PBR bill has been

submitted to UPOV for comment and a copy provided to the author but it is not considered prudent to include details in this report, except to mention that provision is being considered for value for use, farm-saved seed, compulsory licences, and genetically modified plants having to comply with provisions of the Biosafety Act of 2002.

General views of the private seed industry include a request that government must consult with the private sector when developing IPR systems and that releases of new public varieties must consider exclusive licensing. It was felt that public research creates value with new varieties but it is the seed sector that captures this value by bringing seed to farmers in a sustainable way. In the present absence of plant variety protection systems there is little incentive for investing in breeding OPs and that official variety lists give only minor protection. The practice of farm-saved seed is common and farmers tend to get back to breeders only after three or more years to obtain genetically pure seed.

## **MAURITIUS OVERVIEW**

A copy was obtained of the draft PBR bill and it generally meets UPOV requirements. However, in view of the confidentiality of the document no details will be included here.

## **MOZAMBIQUE OVERVIEW**

Mozambique has seed legislation that sets basic standards for seed quality and mandatory variety lists for major food grain crops such as maize, beans and certain vegetables. Varieties from neighbouring states may not be well adapted and new varieties, therefore, have to be tested for agricultural use. Most of the testing is done by the companies and results of one or two years are required. Variety listing also involves DUS tests. Government wants to know from companies in which regions the varieties will be sold and what standard varieties have been used as controls. There is a strong market demand for new varieties of crops like maize and soyabean.

The public research institute IIAM (Institute for Agricultural Research in Mozambique – livestock, plants, forestry) follows the same variety registration procedure and maintains breeder seed. Basic seed production used to be allocated to Semoc under contract, but now mostly goes to the farmer union USEBA as designated foundation seed producer. There are some unofficial agreements for commercial use and some companies pay royalties to IIAM at a rate of 5% on turn-over.

As regards IPR, Mozambique is signatory to the Madrid Agreement, the Nice Agreement, and the Paris Union. A draft has been prepared for PVP and uses the AU Model that provides for PBR, Farmers' rights and Community rights/indigenous knowledge. In order to identify ownership of farmer and community varieties, Mozambique has engaged a project to collect, describe, test, and catalogue such varieties. Varieties that meet DUS requirements will be put on this list. Proprietary varieties owned by companies will appear on the same list. Farmer/community varieties will be limited to use by the owner communities and not other parties. The list will be ongoing so that new varieties selected by breeders, farmers and

communities can continue to be eligible for registering on the list. The collection presently numbers some 7 000.

The 158 varieties on the official list comprise 14 maize hybrids, 13 maize OPs, 11 rice, 3 sorghum, 3 pearl millet, 12 cowpeas, 12 dry beans, 4 groundnut, and 2 soya varieties, as well as 82 vegetable varieties. Some 74 varieties have been excluded from the list..

A PBR draft was prepared in 2002 and updated in 2005. This document is presently with the Ministries of Science & Technology and Commerce & Industry. It was not possible to obtain a copy of this draft.

Government feels that present variety lists provide some protection to the breeder as the owner/seller is identified. Adoption of a PVP bill will strengthen and broaden protection. However, seed trade members feel that there is insufficient monitoring of misuse of varieties on the list. Both government and seed trade agree that Mozambique needs urgently improved varieties to increase food production efficiency. However, seed companies put more effort into hybrids as OPs are subject to farm-saved seed practices. The vegetable market is based more than 80 % on OPs, whereas in more developed countries it is 80% hybrids. Constraints are poor rural infrastructure and limited access of farmers to bank credit.

A national association was recently established that will represent company and distributor members in the seed, crop protection and fertilizer sectors. The number of seed companies is still too few to afford an association of their own as there are only 8 seed companies and 7 distributors active in trade. One seed company and two public institutions are conducting breeding. .

## **NAMIBIA OVERVIEW**

Namibia has no PBR legislation or draft at present and there are no official variety lists. An interim Seed Council was established in June 2005 and seed policies and legislation is being drafted. These will receive priority and will extend to PBR drafts which will be submitted to Cabinet.

There are no real national seed companies but active seed growers produce certified seed from government released foundation seed. Several new varieties were recently released. The only plant breeding and variety trials are being conducted by government.

## **SWAZILAND OVERVIEW**

Swaziland has started negotiations on plant breeders' rights in consultation with breeders. A catalogue of varieties contains names of some 45 Hybrid and OP varieties, and an update is underway. The some 5 seed companies involved in seed

trade include SeedCo, Monsanto and Pannar. Variety testing is conducted by the research institute. Plant breeding is done by CG centres and government.

## **TANZANIA OVERVIEW**

No information has been submitted by Tanzanian representatives, other than that their PBR Bill has been finalized and will soon be submitted to UPOV for comment.

## **ZAMBIA OVERVIEW**

Zambia is a large country with significant agricultural potential but the formal seed industry is small. The country has the ability to be seed producer for neighbouring countries and several thousand tons of maize seed have been exported. The seed industry was under strict government control until about 1991 after which a liberalized economy saw various private seed companies enter the market. Presently Pannar, SeedCo, and Monsanto are active in grain crop seeds while Pioneer is having tests done. The public Zambian Agricultural Research Institute (ZARI) at Mt. Mkulu is doing plant breeding on a range of crops. Other companies like Hygrotech and Kanano are active in the vegetable seed market,

Variety release involves pre-release trials by breeders, followed by application for variety listing that requires DUS tests and two years of government performance trials. Application can be for the six agricultural zones or per zone. Seeds of all major field crops like maize, wheat, cotton, sorghum, and sunflower have to be certified according to OECD criteria, but certification of other seeds is voluntary. The variety release committee comprises members of seed certification, seed control, university, small-holder and commercial farmer associations, and the public research station. Private seed breeders can sit in as observers. A copy of official variety lists could not be obtained as companies only had their own variety lists and no one had a comprehensive list. More information on the regulatory systems could not be obtained as officials from this section were not available for any discussions. The Golden Valley Farm Trust does not breed varieties but offers its facilities for variety trials. It is the largest producer of pasta grain for which there is a major demand.

The Zambian Seed Trade Association has some 15 members. Plant breeding is conducted by 7 parties that include ZARI, the University, Cotton Development Trust, the Tobacco industry, Zamseeds, and SeedCo. Most companies are involved in variety trials. The potential seed market for major species is estimated at 40 000 tons per year.

ZARI is partly self-autonomous and conducts pre-release seed provision to select farmers, with basic seed and commercial production handed to companies or farmers. The institute plans to open up the system so that royalties could be generated but the regulatory amendments to permit this, have not yet been finalized. ZARI remains maintainer of breeder seed but does not recover its full costs. The practice of farm-saved seed remains a deterrent to private breeding on OP species and access to new

varieties from neighbouring countries of crops like soyabeans. Seed sales of farm seed take place even in company labelled bags and obtaining seller licences is easy. Breeders felt that there is insufficient monitoring of abuse of varieties; hence, the focus by private companies on hybrids.

All innovation at the University of Zambia belongs to the university. UNZA has breeding projects on wheat and will invite parties to tender when a variety is ready for release but considers exclusive licensing a risk. Advancement of IPR legislation would be welcomed and several position papers had been developed at the SADC Gene Bank (no copies could be obtained). It is expected that wide consultation will take place during IPR legislation development.

The IPR legislation is under review and a draft document has been developed on PBR that uses elements of the AU Model Law. Discussions revealed that it will be difficult to merge the UPOV system for PBR with the AU Model. The Indian law has been examined for protecting farmers' rights and indigenous knowledge. Parties interviewed agreed that protection can only be effective if it is supported by a legal system. The Director of the Zambian Competition Commission provided a very useful review of the status of relevant IPR legislation as follows:

- The Trade Marks Act (Chapter 693 of Zambian Law) does not allow cover for service marks or well-known marks, and gives only 7 years protection
- Plant breeders' rights law is still at a draft stage (none of the interviewees had a copy)
- Patents (Patents Act chapter 692 of Zambian Law) are available for medicines in terms of diagnostic, therapeutic or surgical methods applicable to humans and animals, but no protection is available for substances being used as food or medicine
- There is no law yet for using geographic indications
- There are laws on industrial designs, copyright and anti-competitive practices
- There exists no protection for layout designs or undisclosed information.
- Zambia is signatory to the Madrid Agreement on Marks, the Berne Convention, the Paris Union, and the Patent Cooperation Treaty.

Modernization of IPR legislation should be seen as part of the Zambia national economic policy under development by the Ministry of Mining, Agriculture, Tourism and Energy. Comments were made that IPR should be seen as having benefits for the economy and to encourage direct foreign investment in agriculture.

## **ZIMBABWE OVERVIEW**

Zimbabwe has had a well developed seed industry for many years, active in exports to many neighbouring states. The seed industry is represented by the Zimbabwe Seed Trade Association and presently has some 30 seed companies as members. The country has had a Plant Breeders Rights Act since the late 1960s and applied in 1998 for UPOV membership. Apparently some changes had to be made in the Act to conform to UPOV 1978 and these were not passed as yet by Parliament. However, active use is made of the existing legislation to protect plant varieties. It was not

possible to obtain a list of varieties protected under PBR as officials considered the information confidential. Neither could a copy of the PBR Act be obtained. The general view of seed companies was that plant breeders' rights serve a useful purpose in protecting ownership although it is not a strong form of protection, and that it stimulates investment in breeding new varieties. Including hybrids under PBR is more a matter of convenience with little additional benefit rather than real protection, and companies do not wish to apply for PBR on parental inbred lines.

In terms of IPR, Zimbabwe is signatory to the Berne Convention, Paris Convention, and the Patent Cooperation Treaty.

The seed industry is closely regulated by government in that all seed qualities are monitored and prices fixed for grower payments, as well as seed prices to distributors and for wholesale and retail. Companies find that this constrains sustainable profitability of the seed industry. Varieties of all major field crops can only be sold if registered on Second Schedule official lists following successful testing in trials over two years at four sites. Application for registration must identify origin of the variety and an annual fee is payable to retain listing. The variety release committee is comprised of government, farmer and breeder representatives. This system applies to government, private and CGIAR breeders.

Present variety lists (a copy of which was provided) contain some 214 variety names made up as follows: hybrid white maize 68, hybrid yellow maize 18, white OP maize 5, tobacco 21, barley 8, beans 4, cowpeas 5, groundnuts 7, bambarra 2, hybrid sorghum 3, OP sorghum 5, soya 11, sunflower 9, wheat 11, pasture 18, cotton, 11, potatoes 6, pearl millet 3, and finger millet 2. The estimated total number of varieties of all species available to farmers is about 300.

The government funded Crop Breeding Institute is active in many crops such as maize, groundnuts, sunflower, dry beans, and potato, while tobacco varieties are bred by the Tobacco Research Board. New varieties are released by way of invitation to tender and a government committee evaluates the tenders after which the variety is awarded usually to two or three companies, and not exclusively to one. Royalties are payable on gross sales and range from 3% to 5%. There is also an annual flat rate fee apart from the royalties.

A copy was obtained of the draft legislative proposal 2003 on protection of biological diversity, farmers' rights and community knowledge, in a step to comply with provisions of the Convention on Biological Diversity. Biological resources are defined as plant, animal and microbial genetic resources, excluding humans. A National Biodiversity Authority, managed under a Board, will be charged with developing an inventory of wealth of resources, identify and classify biological resources, and collect information on knowledge and practices. A clearing house with two focal points (agro-biodiversity and natural resources) will oversee bio-prospecting. Community rights will extend to custodianship of their biological resources. Research permits on these resources will expire after five years. Section VIII deals with traditional use of medicinal plants and such indigenous knowledge will be handled under community systems that do not require formal disclosure or registration.

Of specific interest is that Section VII of the draft follows the correct approach (unlike the AU Model Law) in accordance with the convention, namely that Farmers' Rights are defined as the rights arising from historic and present contributions of farmers in the conservation and use of biodiversity, and their right to benefit sharing. A farmers' variety can be protected if it is new, distinct and identifiable, and not generally known, and he/she will have sole use, right to sell and multiply for 50 years, and to award licences. A farmer in this case also means a community. Exceptions to protection are use for further selection, farm-saving of seed and exchange of seed.

## **SOUTH AFRICA OVERVIEW**

### **SOUTH AFRICAN PLANT AND SEED INDUSTRY PROFILES**

#### ***Seed Industry***

The seed industry has a long track record but derived its major boosts from having been cut off from European seed supplies during the two World Wars. The first private seed companies were established in the 1890s and the first private seed testing lab in the 1940s. Seed quality certification schemes commenced in 1940. The first seed association was established in 1942, followed by associations for specific seed sectors. In 1989 these associations were merged into one, the South African National Seed Organization (SANSOR), as a private non-profit company. SANSOR took over management (on behalf of the Minister) of all official seed certification schemes from government, and acted as licensor of public varieties for five Agricultural Research Council institutes.

In 2004 total seed sales amounted to over ZAR2.2 billion (US\$344million), comprising 76% from agronomic seeds, 15% vegetable seeds, 7% forage/pasture seeds, and less than 2% flower seeds. SANSOR has some 110 members representing private seed companies, agricultural coops, farmers, research institutions, technical/trade associations, and honorary members.

This industry is regulated primarily under the Plant Improvement Act 53/1976, but also falls under provisions of the Plant Pests Act 36/1983 for plant health issues, the Plant Breeders' Rights Act 15/1976 for PVP, and the GMO Act 15/997 for genetically modification activities. Compulsory variety lists exist for all major species and these totalled 2004 varieties in 2004, 918 being agronomic, 871 vegetable, and 215 forage/pasture varieties. Minor species do not have official lists and some species do not fall under legislation. Plant breeders' rights apply to 678 of the listed varieties.

#### ***Deciduous Fruit Industry***

Deciduous fruits, including table grapes, are grown on 77 428 ha that involve 25 000 producers. Some 105 000 workers are employed on farms, and their families add another 400 000 people. The gross value of the industry is ZAR11 billion (US\$1.7 billion), comprising a domestic market of ZAR2 billion (US\$313 million) and exports

of ZAR9 billion (US\$1.41 billion). This industry is clearly export driven and variety based.

Variety lists are managed in collaboration with government. Some varieties are listed as scions, others as rootstocks, a few as pollinators, and the varieties number 536, 2 and 80, respectively. Species covered include apple, cherry, pear, prune, Japanese plum, plumcot, peach, nectarine, and table grape.

### ***Tropical/subtropical Fruit Industry***

This industry is represented by avocado, citrus species, mango, litchi, and macadamia as major crops. Citrus remains one of South Africa's biggest success stories where the country has grown into the 13<sup>th</sup> biggest producer and the second biggest exporter of citrus. The gross value of the crop is ZAR3.67 billion (US\$573 million). Commercial citrus varieties number 11 for valencias, 18 navels, 11 soft citrus, 9 grapefruit, and 7 lemons. Production of oranges comprised 22 758 ha of Valencia and 14 121 ha navel in 2004, yielding 1.1 million tons of which 68% was exported. Gross value was ZAR2.177 billion (US\$ 340 million). Soft citrus (clementines, etc) were grown on 5 456 ha, yielding 162 000 tons with value of R605 million (US\$ 95 million), of which 50% was exported. Grapefruit was grown on 7 803 ha, producing a crop of 26 500 tons with value of ZAR405 million (US\$63 million), 73% being exported. Lemons yielded a crop of 183 000 tons with value of ZAR 483 million (US\$75 million) on 5 026 ha, 56% being exported.

Avocado was grown on 12 000 ha and yielded 100 000 tons, most of which was exported. Mangos produced 100 000 tons on 7 500 ha. Litchi was grown on 3 357 ha and local sales amounted to 2 800 tons. Macadamia is also a success story, presently grown on 10 244 ha which is expected to double in the next few years. The crop was 4 000 tons in 2004, making South Africa the 3<sup>rd</sup> biggest producer contributing 15% of global production.

### ***Nursery and seedling industries***

Almost 1000 enterprises are included under the South African Green Industries Council, SAGIC, that serves as umbrella organization to conduct promotion for groups like the nursery association, SANA, which has 283 members. Also included are associations representing landscape architects, plant propagation, landscape irrigation, and others. A second plant industry sector is represented by the Seedling Growers Association of South Africa, SGASA. These industries collectively represent a multi-million dollar business that brings plants to farmers, public parks and gardens, and home gardeners.

## **SOUTH AFRICAN EXPERIENCE WITH PLANT VARIETY PROTECTION SYSTEMS**

Regulatory systems start with general policy development that involves little or extensive stakeholder and public inputs, development of a draft Bill that may go through several cycles, and consideration by Cabinet, Parliamentary Portfolio Committees and the Council of Provinces (having replaced the Senate). The Bill or Amendment Bill is then published for public comment, after which the final text is

tabled before Parliament for discussion and vote. Any subsequent amendments to an Act have to follow this time-consuming process. Development of regulations may start before or after the Bill becomes an Act. An Act enters into force only when regulations are accepted and published. Amendments to regulations may be made by a Minister with little or extensive consultation and enter into force when published or on date indicated. Specific procedures and administrative guidelines follow from regulations and may be amended with or without consultation.

At present the Government is engaged in a process to update and harmonize all systems of IPR. The Department of Agriculture is drafting an IPR policy, the Department of Science and Technology has developed a policy on indigenous knowledge, and the Agricultural Research Council is developing an IPR strategic plan. Various other stakeholders such as academic institutions are also changing the process of IPR to a system of moving innovation more rapidly to the market. The Department of Agricultural is developing a policy on indigenous food crops. This open a new avenue for a much neglected resource to benefit from plant breeders rights, patents, trade marks, and geographic indication. It ties in with the policy on indigenous knowledge.

### ***Patents***

The Patents Act of 1915 actually made provision for plant varieties but this was removed when plant breeders' rights came into force. The Patents Office is a non-examining one and will reject an application only if administrative or denomination requirements are not met. Applications are published and the public or other patents holders can lodge objections. The essence for eligibility is that the invention must have followed an inventive step. The Amended Act 38 of 1997 clarified provisions for microbiological processes and products as required under the Budapest Treaty. Chapter V(b) specifically excluded for eligibility "***any animal or plant variety or any essentially biological process for the production of an animal or plant, not being a microbiological process or product of such a process***". This follows the UK and EU position on non-patentability of plant varieties. Chapter IV defines the period of protection as 20 years, subject to payment of initial and annual fees, and patents are granted for South Africa only.

The Patents Office receives some 10 000 applications per year and has not yet succeeded in finalizing a computer data base so that it becomes very difficult to locate the number of patents granted for specific inventions like genetic modification technologies. The many complexities brought about by modern biotechnology has caused grey areas and there seems to be little watershed legal cases in this regard. The European Patents Office, for example, ruled that plant varieties are not eligible but that plant cells are eligible as they fall within the definition of micro-organisms. The South African interpretation is unknown.

The typical claims under a patent application for a genetically modified plant variety may cover:

- The genetic construct containing the novel gene (such as Bt ),
- the marker gene and the promoter
- the vector system used for moving genes from the lab into the plant by way of a plasmid inside a bacterium or direct biolistics

- the techniques for detecting/verifying the novel gene and its protein
- new uses of a specific herbicide in herbicide tolerant varieties, etc.

For plants the claims could also involve a newly identified and isolated product, the method of isolation and method of production outside of the plant, specific attributes in respect of proven health or nutritional benefits, etc.

As the patent office's system does not facilitate access to patents granted on plant varieties, it is not possible to quantify such patents. It can be accepted that all patents applicable to GM varieties under test or field trials or commercially released, enjoy patent registration in South Africa on the same basis as in the country of origin, except that the entire plant cannot be patented as in the US.

### ***Trade Marks***

The Trade Marks Act (as amended) makes provision in Class 31 for eligibility of ***“agricultural, horticultural and forestry products that are not covered in other classes. These include live animals, fresh fruits and vegetables, seeds, natural plants and flowers, foodstuffs for animals, and malt”***.

A trade mark is a distinctive sign or mark which identifies certain goods or services produced by a specific party, and may consist of words, letters, numbers, drawings, etc., or combination thereof. It ensures exclusive right to the owner to use the trade mark for an unspecified period as long as the appropriate fees are paid. The owner can continue to derive benefits such as royalties on the trade mark on a variety even after plant breeders' rights or patents have expired. Application is lodged with an office of the Registrar that will launch a search and examination to ensure that the proposed mark does not conflict with existing marks. It should also be verified that the mark does not conflict with variety names on official variety lists as a trade mark can never be used as a variety name, but only for a specific class of varieties or variety traits or qualities. The mark has to be distinct from the name under which the variety is sold and Class 31 marks require an endorsement that ***“the applicant undertakes that the trade mark name will not be used as a varietal name”***.

The benefit is that the variety owner can use the trade mark to build up a reputation on the specific traits or qualities of the variety/varieties to which the mark applies. Trade marks for plant varieties have been used especially for fruits and flowers, for example AFRICAN PRIDE® for South African bred yellow plums. Another example is Cripps Pink apple bred in Australia and protected under the trade mark Pink Lady®. Genetically modified varieties developed by multinationals also carry trade marks such as Yieldgard® for insect resistant maize carrying the Bt gene, Bollgard® for insect resistant cotton, or RoundupReady® for herbicide tolerant soybeans, maize and canola.

The office of the Registrar of Trade Marks at present does not have a data base that facilitates a computer search for plant trade marks.

### ***Plant Breeders' Rights***

South Africa started to develop plant breeders' right legislation around 1965, approved the Plant Breeders Rights' Act 15 of 1976, and became the 10th member of

UPOV in 1978. The Act was amended in 1996 in compliance with UPOV 1991. However South Africa never acceded formally to the 1991 Convention, probably as the Act did not extend to all species and as Article 23A on farm-saved harvested material for re-planting, was worded in such a way that it does not comply with UPOV 1991 Article 15.2.

Key provisions in the Act include:

Protection for production, offering for sale and marketing and to harvested material or product from harvested material in special cases (when variety marketed without consent for further propagation or export for propagation); eligible varieties must be new distinct uniform and stable, not offered for sale in the country for over one year, or 4 years elsewhere (6 years for vines, fruit, trees); have an acceptable denomination; protection period 20 years (5 + 15) and 25 years for trees; opportunity for priority, provisional protection; provision for farm-saved seed; details of infringement of rights; breeders' privilege (compulsory exceptions for private, non-commercial purposes, experimental purposes, or for breeding other varieties, excluding EDVs); mandatory licensing; essentially derived varieties (varieties which are predominantly derived from another protected variety = IV, or from a variety predominantly derived from the IV, that is clearly distinguishable from the IV, except for the derived differences conforms to the IV in expression of essential traits of the IV; objections, appeals; penalties.

UPOV Article 15(2) restricts protection when, within reasonable limits and subject to legitimate interests of the breeder, a farmer uses harvested material from a protected variety for planting on his own farm. The problem is that neither reasonable limits nor legitimate interests are defined, and decisions are left to member countries. This exception does not entitle the farmer to market harvested material for planting purposes. The US has allowed use of harvested material and now has a new regulation that permits sale but not under brand names. The EU allows farm-saved seed of specific species with the agreement that the farmer pays royalties (at half rate) to the breeder—small-scale farmers are exempt from royalties. South Africa Article 23 in the Act to read

***“a person who procured propagating material in a legitimate manner shall not infringe the breeders' right if he/she is a farmer who on land occupied by him/her, uses harvested material obtained on such land from that propagating material for the purposes of propagation: provided that harvested material obtained from re-planted propagating material, shall not be used for purposes of propagation by any person other than that farmer”***

The word “re-planted” implies that the first cycle of harvested material used for propagation purposes does not infringe on the breeder's rights. This could be interpreted that this sub-article violates UPOV Article 15.2 in that it does not “protect the legitimate interests of the breeder” and that it does not comply with WTO Article 27.3.b as the protection granted is not “effective”.

Key parameters of plant breeders' rights (PBRs) in force in South Africa can be summarized as follows:

- Total number of PBRs as on 30 December 2004 = 1807 for 159 species

- PBRs per crop group are 236 for 17 species of vegetables; 774 for 67 ornamental/flower species; 244 for 28 fruit species; 442 for 24 agronomic (grain, oil, protein, industrial crops) species; and 111 for 23 forage/grass species.
- The species with the highest PBR count is roses with 356 varieties
- The data base of the Registrar of PBR shows a total number of 1133 parties that have been applying for PBR. Most of these are small operators which proves that South African PBR is not dominated by a few large local or a few multinational companies
- South African breeders own a total of 704 varieties; 344 by private companies and breeders, 87 by multinational subsidiaries based in South Africa, 259 by the Agricultural Research Council, 10 by universities, and 4 by one biodiversity institute. This shows the benefit of PBR for successful investment in breeding by local private breeders
- South African ownership of PBR varieties comprises 39 per cent of the 1807 total. Private South African varieties are 431 and public varieties are 237, showing the investment by the private sector in plant breeding
- Analysis of listed fruit varieties shows that 34 varieties had PBR out of 89 apple listed as scion material; 2 had PBR out of 11 rootstock varieties; 6 out of 16 apricots had PBR; 1 out of 5 prune varieties; 21 out of 48 nectarine; 37 out of 118 peach; 23 out of 47 Japanese plum; all 3 plumcots; 5 out of 18 Prunus cross rootstock; 13 out of 42 pear; 2 out of pear rootstock; 32 out of 186 table grape; and 5 out of 44 table grape rootstock varieties had protection under PBR.
- Insight into stimulus for breeding varieties of open-pollinated, self-pollinated and vegetatively propagated crops was obtained by comparing PBRs granted over 15 years for a few select crops where profit margins are low and farm-saved seed is common. PBRs granted over 4 years from 2001-2004 were compared against total over 15 years since 1990. For wheat the data show that 26 (45 %) of the total PBRs granted since 1990, were granted in the past 4 years; for triticale the figures were 5 varieties (42%) in the last 4 years; for potatoes 25 (41%) in the last 4 years; for dry beans 20 (43%) in the last 4 years; and for soyabeans 44% in the last 4 years. Therefore, companies continue to breed new varieties although their persistence may be limited
- Comparison of the last 5 years of PBRs granted with the past 20 years yielded a different picture. For citrus the figure was 55 %, apple 22%, peach 9%; nectarine 4%, and table grapes 36% of the total registered in the last 5 years
- Plant breeders, in general, do not see much value in registering PBR on hybrids as the protection lies in confidential information on the pedigree i.e. combination of parent lines. Farm saved seed will result in segregation of beneficial traits and loss of hybrid vigour. Yet, following PBR on new open-pollinated varieties that started in 1992, some 74 PBRs (88% of the 84 total) were registered in the last 5 years, mostly for hybrids. The reasoning seems to be that only a minimal fee is charged when application and testing for distinctness, uniformity and stability take place simultaneously for official variety listing and PBR. Thus, some protection is gained for minimal expense. Breeders have not yet applied for PBR on inbred lines due to risk on compulsory

licensing and risk of inbreds having to be planted out in government tests, as well as the risk of applications for compulsory licences.

### *Contracts, licences, royalties*

Contractual agreements to grant one or more licences for the production and/or marketing fall under contract law and may be agreed upon irrespective of whether the variety is protected under PVP systems or not, or whether such protection has been exhausted. South African plant and seed companies have made extensive use of contracts and licences, both for maintaining control of their varieties locally or internationally, and for gaining access to varieties owned by breeders in other countries. Such contracts may pertain to marketing/distribution only or production and marketing of the propagating material, or may extend to harvested products such as fruit and flowers. It may limit the contractee/licensee on the number of plants (trees or flowering plants) that he may grow, as well as a limit on the geographical area where the plants or products may be marketed. Contracts may have provision for reciprocity in exchange of varieties, and may include partnership research. Royalties may be levied on the propagating material and/or on the marketed products.

A good example exists in public seed varieties licensed through SANSOR to members of the seed industry. In 1989 an agreement was signed between the Department of Agriculture, the Tomato Producers Organization and SANSOR and this contract was delegated to the Agricultural Research Council in 1991 as a new, extended agreement between the ARC and SANSOR. In essence, new seed varieties released by five research institutions—Vegetable and Ornamental Plants Institute-Roodeplaat, Grain Crops Institute, Tobacco and Cotton Research Institute, Small Grains Institute, and the Range and Forage Institute—would be made available to SANSOR first in the form of a head licence, for sub-licensing to its members. The agreement was limited to South Africa and immediate neighbours, but in some cases foreign licences were also handled. The system was further secured inasmuch as the ARC took out PVP on all its varieties, remained owner of the varieties and sole maintainer of breeder seed, and all seed was to be produced under official seed certification schemes managed by SANSOR.

The types of contracts or sub-licences awarded by SANSOR to its members covered the following:

- Use of material for research
- Use of material for testing
- Testing of inbred lines in hybrids leading to application for their commercial use
- Production of foundation seed only
- Exclusive sub-licences
- Open sub-licences to qualifying members
- Sub-licences limiting sales to South Africa only
- Sub-licences for seed export only

Subsequently, SANSOR also acted to collect royalties on seed crop varieties for the ARC in cases of direct licence agreements between the ARC and companies that often involved joint research. A similar agreement is ongoing between SANSOR and the

Department of Genetics, University of Stellenbosch, for new small grain varieties. In both cases SANSOR, in collaboration with the ARC and seed trade members, set guidelines for prices for breeder and basic (foundation) seed produced by ARC institutes for sub-licensees. This arrangement has changed in recent years so that some institutes may license their varieties directly to seed companies and SANSOR acts only to monitor seed sales and collect royalties.

The modus operandi has been for a pre-release consensus between the seed trade and the ARC institutes, on a variety-by-variety basis, on whether a new variety will be released on the basis of an exclusive sub-licence for which parties have to tender, or open sub-licences to qualifying members on a basis of a pre-determined royalty. Royalties could be on seed sales, seed production or a flat fee plus royalties. As exception, the right to market a variety could be awarded on a once-off payment basis. Collection of royalties and monitoring of production functions were remunerated to SANSOR on a 10% basis of royalties collected, but a lower fee where the institute licenses a variety directly..

During 2004 SANSOR handled 53 varieties which had been licensed by the ARC to SANSOR and 43 varieties licensed directly between the ARC and companies. These involved 90 sub-licences awarded by SANSOR to seed companies and 53 licences awarded directly by the ARC. Thus, royalties were collected on 143 licensing agreements and during the period 1997 to 2004 SANSOR collected over ZAR 15 million (US\$ 2.4 million) in royalties for institutes. At present an update of the ARC-SANSOR main agreement is still pending.

The ARC takes out plant breeders' rights on all new varieties and for seed crops, seed certification is mandatory. IPR remains vested in the ARC. The various institutes of the ARC follow different procedures in licensing.

The ARC Infruitec-Nietvoorbij (responsible for research on deciduous fruits, wine and table grapes as well as some alternative fruits) obtains part of its funding from the Deciduous Fruit Producers' Trust, Canning Fruit Producers' Association and the Dried Fruit Technical Services and licences its varieties to the South African Plant Improvement Organization Trust (SAPO) who also receives some financial support from the above-mentioned industry bodies. SAPO is responsible for managing the production of buds under the plant improvement scheme and coordinates production of trees by approved nurseries for sale to farmers. SAPO is also responsible for collecting South African royalties levied on both trees and fruit, and receives a commission on royalties collected. However, ARC Infruitec-Nietvoorbij owns all IPR on its varieties and alone makes decisions on licensing. Licence allocation may go to one party or to a group of growers. Monitoring of infringements takes place on all planting of ARC bred varieties (locally and abroad), while exports of ARC varieties are checked for adherence to quality standards by the Perishable Products Export Control Board. Licensing of offshore parties is based on using a local agent or working directly with the foreign party. The institute has registered a number of trade marks for usage on their very unique varieties, in addition to plant breeders' rights on all its varieties.

The ARC-CSFI (Citrus and Subtropical Fruit) has released PBR varieties to nurseries for propagation under contract and to farmers who have to sign a non-propagation

agreement, similar to an MTA. Although fruit producer associations make financial contributions, farmers still have to pay royalties to the ARC on the fruit sold. The mango variety Heidi has been sold to a commercial enterprise. A Trade Mark is planned for its seedless lemon variety that is already being marketed internationally. At present release of new varieties is being held back until a new policy is completed. This will entail a Variety Management Agency that will handle all releases, monitoring and collection of royalties. Farmers will have to apply to this agency and, upon approval, will place orders for propagating material with accredited nurseries. Licences may be granted to individual farmers or farmer groups, known as clubs. Export licences for fruit will be granted to specific qualified exporters and farmers who export can deliver fruit of the ARC varieties only to these authorized exporters. The institute will remain the only source of authentic breeder material. There are no formal variety lists for subtropical fruit trees and farmers can plant any variety, except in the case of citrus where the citrus association maintains its own lists.

The ARC-SGI (winter cereal grains) has moved more towards direct licensing with agricultural coop companies and having SANSOR only to monitor and collect royalties. Research funding is partly received from the Winter Cereal Trust and the institute will retain all IPR. In the case of barley breeding the South African barley brewers industry provides funding and IPR on varieties goes to them. Establishment of a joint non-profit company is being considered. Trade mark protection for specific benefits associated with wheat varieties has been considered but the baking industry has not yet supported the proposal due to cost of identity preservation. At present the institute does not have any joint breeding programmes with the private sector.

The ARC-RFI (range, pasture and forage crops) has made use of SANSOR in licensing their varieties, also for international marketing. It has also been active in contract research with local seed companies on projects that ranged from making final selections in and testing of candidate varieties, to breeding specific varieties. The institute contracts farmers to produce basic (foundation) seed from breeder seed provided by the institute. Standard conditions apply such as official seed certification, ownership vested in the ARC, non-alienation by the grower, and access to inspect the production field. To date the ARC retains IPR on all varieties developed. At present the institute has a contract with a UK company that will also involve exchange of genetic resources.

The ARC-VOPI (vegetables and ornamental plants) has two centres, the main one being at Roodeplaats near Pretoria, and the smaller centre for Cape indigenous floral plants (collectively called fynbos) near Stellenbosch. The fynbos centre breeds new varieties and maintains a breeding nursery and a small commercial nursery from where they make available plants for sale to licensed or contracted parties. SAPPEX, the South African Protea Producer Exporters, has the role to only distribute ARC variety lists and order forms. They play no role in licensing of varieties released by private breeder producers. The ARC exports material under contractual arrangements to foreign parties and imports varieties for local release.

The ARC-GCI (maize, sorghum, oilseeds and protein summer crops) used to play a major role in successfully breeding maize OPs, hybrids and inbred lines released freely to seed companies. Since 1990 this material was released through SANSOR under licence agreement. Not many of these inbred lines made it to commercial hybrids, and even less so for sorghum. Sunflower and groundnut releases were much

more successful. At present only two groundnut varieties are still carrying royalties, both handled through SANSOR: Kwarts is open to all parties, and Akwa managed by the Grain Silo Industry for its agricultural cooperative company members. The institute maintains breeder seed while certified basic seed is produced by GSI members or licensed growers. No varieties have been licensed to foreign parties and no joint groundnut projects are in place. No patents are envisaged on its groundnut DNA fingerprinting diagnostics. Except for one patented gene in soya, the institute prefers to publish data and not seek patents. Joint research on sunflower and soya with private companies leads to licensing to the partners with IPR remaining in institute. Sharing of royalties may be considered in future. PBR protection on OPs is poor and more effect is obtained through mandatory seed certification, bolstered by Agri-Inspection policing.

The sugar cane industry has since early 1900 funded its own research and development by way of levies payable to the South African Sugar Association which apply these funds for their Sugar Experiment Station (SASEX). Their plant breeding track record is an excellent one. To mention a few, NC310 was released around 1945, was grown in some 50 countries, and remained a global best-seller for years, while present sugar production in Africa is based almost 90 per cent on SASEX varieties. They do not take out any IPR but release new varieties free to South African cane growers. Releases outside South Africa are based on contract production with royalty payments and these contracts are handled on a country-by-country basis. The advent of modern biotechnology innovation may necessitate a policy change in future.

The handling of IPR and contacts/licensing of public research institutions also find itself in a state of change. The biggest public institution, the Council for Scientific and Industrial Research (CSIR), now works within the guidelines for processes and procedures set by the Department of Science and Technology in its policy for public research. All CSIR work is executed on the basis of contracts and the procedures will depend upon ratio of inputs provided by partners—financial, in kind, resources, as well as background IPR used and expected forthcoming new IPR. These will determine the basis for benefit sharing between partners. The anticipated amendments to IPR legislation will also impact on benefit sharing, such as use of indigenous knowledge. The CSIR also feels that IPR regimes need to be strengthened in terms of policing and enforcement.

Traditionally, universities own all IPR generated from own or partnership research and at present certain issues are handled on an ad hoc basis. These range from products available free to society to start-up companies to produce and market goods and services where the university, its relevant institute and other partners may share equity in the company.

The South African National Biodiversity Institute (SANBI), that comprises the former Botanical Research Institute and Kirstenbosch Botanical Gardens, is charged with research to generate knowledge which is distributed free to all of society. Plant material is also provided at a fee to all researchers and sold to the public at retail prices and, apart from three varieties that have plant breeders' rights, no IPR is taken out. The institute has one contractual agreement with a foreign company on joint research. Copyright on information is a future possibility. Presently the institute works within the draft policy and will take indigenous knowledge into account, as well as benefit sharing. Plant material made available for evaluation and testing is

handled on a MTA agreement, signed by both parties and expected to be upheld by both. The recipient may use propagated material or derivatives for non-commercial purposes but any utilization must be done on a benefit sharing basis that includes research results and copies of publications. SANBI and the country of origin must be acknowledged in all publications. Any commercial use of the material, progeny or derivatives requires a separate written agreement that defines benefit sharing. The recipient shall also not transfer material to third parties without prior informed consent. SANBI states that it makes no warranty of identity, safety or fitness for any use, and does not accept any liability.

### ***Indigenous Knowledge Systems***

The South African Cabinet recently adopted a policy on Indigenous Knowledge Systems (IKS) in an effort to recognize, affirm, develop, and promote IKS. The global role of IKS in developing pharmaceutical products is well-known. The country is signatory to WTO-TRIPS and government believes that IKS property could be protected under a *sui generis* system (Article 27.3.b). It is looking at the Indian legislation as a possible model and envisages that government should record indigenous knowledge, set minimum standards for benefit-sharing, have agreement on public declaration of knowledge, and have agreement on certification of IK holders and their rights.

The first step was to insert into the Patents Amendment Bill 2004 in Article 25A that “*non-disclosure or wrongful disclosure of use of prior of indigenous knowledge, oral or otherwise, as grounds for rejection or revocation of a patent*” and that “*any person may institute legal actions with a view of rescinding the patent*”. These principles should be endorsed provided that it facilitates research, development, and benefit-sharing, and not obstruct it, and that provision for private legal action may not lead to frivolous litigation. It is not clear how the proposed article could be expected to be implemented while there is no IKS legislation, documentation or any administrative system for IK.

### ***General comments by the seed industry on plant breeders’ rights***

- PBR is generally beneficial—international companies do not invest where PBR is absent, few companies will invest in OPs, PBR encourages breeding, new varieties, new entrants, also small-scale private breeders, more beneficial for OPs than hybrids
- Recently more hybrids were awarded PBR, not due to protection but because low fee for applying for variety listing and PBR when done at same time.
- Access to international germplasm, more important for OPs than hybrids. Inbreds generally not protected by PBR due to risks of compulsory licences and exposure when in government plant-outs. Breeders’ privilege to breed from protected varieties, is constrained by patents on GM varieties.
- IPR has little effect on seed price per se—new varieties generally introduced at higher price, off-set by improved performance; cannot separate the two, as well as companies need to extend product range even if OP varieties have low profit margins. GM varieties carry high technology in addition to seed price, but benefits outweigh high price.
- Improved varieties are scale-neutral, so small-holder farmer also benefits

- PBR enforcement is generally weak, especially in OPs—some 60 % plus of wheat and soya plantings come from farm-saved seed on commercial farms. In South Africa this impact from small-holder farmers is negligible. Analysis of SANSOR statistics showed that monetary loss due to commercial farm-saved seed is some R 220 million (\$34 million) = 10% of total annual market. Several companies have pulled out of wheat and groundnut breeding. Nevertheless, benefits are appreciated from the deterrent resulting from the SANSOR contract with Agri-Inspec policing function.
- Benefits from breeding, stimulated by PBR, are evident from better disease and pest resistance, higher yields, more dependable production, food safety, product qualities— all documented in many performance trials comparing old and new varieties-- maize yields per hectare rose five fold from 1950 to 2000, wheat yields four and half- fold
- Contracts and licences are often used and considered valuable (essential for GM crops).
- Joint R & D and shared IPR are considered useful on a case-by-case basis.
- It is essential for SADC members to develop IPR regimes on a harmonized basis. Companies do not make their important new varieties available for sale or even for trials where there is no protection, to the detriment of neighbouring states and their production efficiency and food security. It is necessary to overcome the North versus South mistrust on IPR and the scare of invasion by big corporations. Africa stands to gain much from their rich biodiversity by providing IPR.
- Most plant breeders were found to be poorly informed about the impact of new biodiversity legislation, policy development on IPR, new focus on indigenous food crops, use of patents and trade marks

***Additional comments by fruit industry members***

- The fruit industry is a high cost business and, in South Africa, is largely export-driven and very dependent on ongoing provision of tailor-made new varieties to meet changing consumer preferences. Exporters need to focus on adding value to retain market share. One example is the licensing of the Australian apple, Pink Lady, which brought nett benefit increase of R65 million (\$10 million) over four years for the South African growers. There are no free world markets. In industrial countries, especially in the EU, market trends are dictated by an oligopoly. For the EU this is dominated by four major supermarket groups that demand a full range of varieties. Therefore, without new varieties there will be no fruit industry.
- High cost is also reflected in the fact that 65% of overheads come from promotion and administration. New varieties are the key in promotion.
- PBR is a weak form of IPR. Enforcement by way of litigation is expensive: some R300 000 (\$46 000) for a court case, escalated by another R800 000 (\$123 000) when it goes to appeal court. One method is to police exports so that unlawful consignments are stopped. The best solution is to maintain strict controls through the chain, from the company to the farmer producer to the market.
- Contracts and licensing are a necessity. The trend now is to license groups of producers, known as clubs. Royalties of \$1.20 per carton may seem high, but are minor in terms of export value.

- Benefits for the consumer are that those who can afford speciality fruits are serviced, while the low income groups have access to cheaper older varieties that are still produced.
- Most production is done by commercial farmers using high technology management. Small-holder farmers and farm labourers are being brought in by way of mentor assistance or by an equity stake in farms that have been converted to companies. Benefits for farmers include disease resistant varieties that produce up to 50% more yield of better quality fruit, as well as increased range of varieties that extends the production season.
- Intellectual rights protection has resulted in major expansion in number of new breeders globally.
- SADC members will have difficulty in accessing new varieties if no IPR protection exists. One example is the table grape producers along the Orange River on the Namibian side that are not allowed to obtain PBR protected varieties.

## IPR AND MODERN BIOTECHNOLOGY COMPLEXITIES

It is a fact that legislation tends to follow technology and modern biotechnology brought with it complexities that regulatory systems were not geared for. Some of these are highlighted below.

- Most GM varieties are protected under patents, trade marks and plant breeders' rights. Furthermore, protection also resides in company secrets or company information.
- In the 1980s and early 1990s broad patents on GM varieties were awarded, later rescinded or amended (Agracetus), and biotech companies have been spending a lot of money on litigation in patent and licensing disputes. Licensing and cross-licensing of technologies and varieties have partly resolved these disputes..
- Pre-UPOV 1991 precluded both patents and PBR on varieties, now allowed under 1991.
- WTO-TRIPS Article 27.3.(b) requires patent or *sui generis* protection on varieties, but micro-organisms and cell lines or essentially non-biological processes must be eligible for patents. (Definition of non-biological processes.?)
- US and EU differ on patent requirements and on breeders' privilege. Many developing countries have no patent or PBR laws.
- Plant biotech innovations are self-replicating, unlike industrial inventions.
- Lack of certainty on "using" patented seed—implied licence or prohibited to save seed?
- Is regulation permitting farm-saved seed contrary to patent law?
- Is a company contract to prevent farm-saved seed contrary to freedom to operate?
- The US and EU basically agree: gene sequences in nature cannot be patented, unless isolated, described and function identified. EU Directive 1998 requires novelty, inventive step, potential for industrial use, and adequate disclosure. Protection extends to biological material derived through propagation or multiplication, having the same characteristics.
- UPOV identified the ability of modern biotech to insert single genes or make cosmetic changes in a protected variety; hence, the Essentially Derived Variety principle. EDV is not well defined or quantified. No legal case history for jurisprudence presently exists, apart from one recent case in France involving an ornamental.

## ANALYSIS OF AFRICAN MODEL LAW

The African Model Law on the Protection of Rights of Local Communities, Farmers and Breeders, and the Regulation of Access to Biological Resources, was first published by the Organization of African Unity in 2000 as an explanatory booklet. This document attempted to bring together in one model different aspects of IPR and of access to biological resources. The Model Law also strived to accommodate historic practices by small-holder farmers to save seed, while allowing plant breeders' rights to breeders. It was intended to serve as a model from which national states could develop their own IPR systems. However, some parties seem to push for adoption of the model in its present form.

Various Articles in the Plant Breeders' Rights section comply with UPOV and fundamental IPR requirements, while others do not, and some issues are being identified below as points for consideration by FANRPAN. Such consideration will require comparing the provisions of the Model Law with basic requirements of IPR, namely, ownership, innovative steps, disclosure and documentation of basic information, description of material and deposit of samples, and exhaustion of rights after a specified period. It should also be measured against WTO-TRIPS requirements of a patent or an effective *sui generis* system; the UPOV Convention, and the OAPI Accord de Bangui system for PVP.

### PART I. Objectives:

These include rights of communities, farmers and breeders; and the supply of good quality seed and plant material

### PART II. Definition and Scope:

Definitions include community rights, community knowledge, and local communities, but exclude definition of farmers' rights (but included in Article 24 of PART V as per CBD definition, and in Article 26 as for farm-saved seed) and of breeders (referred to in Scope).

### PART III. Access to biological resources:

The important aspect in Article 9.1 is that "patents over life forms and biological processes are not recognized and cannot be applied for". In the absence of definitions of life forms and biological processes one might assume that for gene constructs, vector systems, natural organic chemicals, and innovative processes for isolating, characterizing and synthesizing these, existing patents or eligibility for patenting would not be recognized. The balance of PART III deals for systems to comply with the CBD.

### PART IV. Community Rights:

Articles deal with right of communities to refuse consent (PIC) and access; to withdraw, restrict, or refuse consent or access re agreements; community rights to use, exchange, share biological resources; that no legal barriers be placed on use as above; community IPR protection be recognized; and that items for use will be decided by communities. Unqualified refusal of consent is contrary to the CBD.

### PART V. Farmers' Rights:

Farmer varieties and breeds are to be recognized; these are to be identified by communities; varieties to be granted IPR under a certificate without having to meet novelty, distinctness, uniformity or stability; that such rights are exclusive to the community; protection of indigenous knowledge; free use of farm-saved material of protected farmer varieties; free use of farm-saved material of PBR protected breeder varieties; collective saving, use, multiplication, processing of PBR protected varieties, except no commercial selling; PBR on breeder varieties may be restricted; certification or label for products from biological resource; and certificate for fair trade i.e. fair benefit sharing.

NOTE: Two issues are blended into the Farmers' Rights Section: ***Farmers' Rights*** which are defined in the CBD (and in Article 24 PART V) as rights of farmers for recognition of their historic contribution to conserving and selecting biodiversity, and their concomitant right to benefit sharing; and ***Farmers Privilege*** which is defined in UPOV Article 15.2 as the privilege/opportunity to save harvested material for re-use as planting material on own holdings, taking into account legitimate interests of breeder. The blending of these two separate issues creates conflict and confusion.

#### PART VI. Plant Breeders' Rights (PBR):

Article 30.2 makes PBR subservient to provisions of Farmers' Rights. Article 31.1.a gives freedom to farmers to obtain seed to be planted for non-commercial purposes, while 31.1.b gives the right to sell material for food; 31.1.c allows selling of propagating material on farm or other place; 31.1.g allows obtaining PBR seed from gene banks or genetic centres. Article 31.2 permits farmers to save, exchange and use harvested seed of a PBR variety for re-planting repetitively.

Restrictions to PBR protection in Article 33 include seed that has to be imported (a trade issue) or where needs of community have not been met. The PBR holder will be compensated. Article 33.3 gives no grounds for compulsory licensing.

Article 36 does not explain details of infringements of PBR except if one refers back to Article 30.1 dealing briefly with breeders' rights.

#### PART VII: Institutional Arrangements

Article 57 provides for establishment of a National Competent Authority to implement and enforce the legislation, while Article 58 details duties with respect to community and farmers' rights. The latter Article makes no reference to PBR but the former Article refers to Article 29 which, in fact, deals with DUS tests for PBR only, and not the Authority

Articles 59 to 61 deal with establishment of a National Inter-Sectoral Coordination Body to coordinate implementation of the legislation by the Authority—an overseeing role?.

Appointment of a Technical Advisory Body is provided for in Articles 62 to 63, while Articles 64 to 65 deal with establishment of a National Information System to serve as clearing house i.e. a national data repository.

A Community Gene Fund is proposed in Article 66 as a Trust for managing donations, funds from benefit sharing, and a royalty on PBR varieties that made use of farmer varieties. It is not clear whether the PBR varieties will contribute twice through benefit sharing and royalties.

#### PART VIII. Enabling Provisions:

Article 67 details sanctions and penalties.

Article 68 briefly makes provision for appeals regarding agreements on access to biological resources, without reference to Farmers' Rights or PBR issues.

## **ANALYSIS OF THE ACCORD DE BANGUI**

The Accord De Bangui under OAPI is a plant variety protection regime that was drafted to put a harmonized system in place for some 16 Francophone countries in West Africa. It is largely modelled after the 1991 UPOV Convention although the format and specific wording in many articles are not identical. The Accord defines variety and essential derivation, as well as the criteria for novelty, distinctness, uniformity, and stability as under UPOV. The scope covers all plant taxa, genera and species, but, unlike UPOV, excludes varieties in the wild that have not been cultivated or improved by man. Protection in Articles 28 and 29 covers harvested material, plants and plant parts, and unauthorized includes harvested material, subject to Article 30. The latter creates the following exceptions to protection: private, non-commercial use, experiments and research, further breeding, and farm-saved material, except for fruit, forestry or ornamental plants. Article 43 defines infringements.

The basic differences from UPOV are:

- Protection covers plants and plant parts
- Farm-saved seed is allowed for re-planting on own farm but not qualified, while farm-saved material of fruit, forestry and ornamental plants is not permitted
- Protection is for 25 years
- All species are eligible, except undomesticated plants growing in the wild
- Article 52 allows protection for known varieties (not new), provided that application is made within one year of the date of entry into force of the Accord, and that the variety has been entered on the national catalogue of commercial varieties in a UPOV member state, or on a variety register kept by a professional association.

The Accord has been ratified and the application of OAPI approved by UPOV, resulting in the 16 member states joining UPOV as a regional block on January 1, 2006.

## SUMMARY

This study into plant variety protection systems in target SADC countries, commissioned by FANRPAN, has as basic objective to establish an overview of status of legal protection of ownership of plant varieties, and experience, benefits and deficiencies in these systems. This review will serve as discussion document to develop policy proposals for SADC member states to comply with WTO-TRIPS and to find ways to assist members in the process.

The approach was to access regional and international documents, and to obtain update information by way of personal interviews and visits to relevant parties in South Africa, Malawi, Zambia, Zimbabwe and Mozambique. Information on Angola was sourced by way of e-mails. Additional comments on the target counties, as well as on other SADC member states, were received from participants in the PVP Workshop held in Lusaka on November 21-25, 2005. Little or no information was obtained on Madagascar, Mauritius and Tanzania. Information on South Africa was much more extensive as the author has many personal contacts, companies and institutions readily provided details, and official statistics on variety lists and PBR could be accessed from the website of the Department of Agriculture.

The right to benefits from innovation is a basic human right. History has shown that protection of such rights stimulates further innovation and benefits extend to both the innovator, the user society at large. New plant varieties are eligible for intellectual property protection under plant breeders' rights provided in the UPOV convention, while protection also is available for patents on processes and products that involve innovative steps and are not natural biological processes. A plant variety per se is not patentable, but micro-organisms are eligible. Trade marks can be applied for special traits associated with plants, but such marks cannot be used as variety names. The eligibility for protection of such intellectual property in general requires proof of ownership, innovative steps, description of the material and deposit thereof, and some useful application of the product. Contracts and licensing agreements are often used to allocate rights for production and marketing of varieties exclusively to one or a few parties. The potential for using geographic indications for varieties and their products having special values associated with their geographic origin, has as yet not been exploited. New attention is being focused at national and international levels for protection of land races and farmer varieties, as well as indigenous community knowledge associated with plants.

### *Country status of PVP*

The study showed that no PBR law or draft exists in Botswana, Lesotho and Swaziland; Angola and Namibia have a first draft, while the DRC, Malawi, Mauritius, Mozambique, and Tanzania have advanced or final drafts. Zimbabwe and South Africa have had PBR laws since the mid sixties. Zimbabwe has not yet acceded to UPOV but is in the process of doing so, while South Africa became 10<sup>th</sup> member of UPOV in 1978 and amended its legislation in 1996 to meet almost all UPOV 1991 requirements.

Most countries have official variety lists for major food crop species that dictate that only such varieties may be sold. At present the lists in Namibia and Angola are unofficial but are being updated and formalized. Lesotho has no list as yet. The number of varieties on official lists range from 40 to over 200 in Zambia and Zimbabwe, to 1978 in South Africa. Only Zimbabwe and South Africa have made use of PBR and presently have some 50 and 1807 PBR varieties listed, respectively. Lists of PBR varieties are separate from official lists for marketing seed but often varieties will appear on both lists.

The number of seed companies involved in production and marketing is related to the level of development of the seed and agricultural industries and vary from very few to over 60. In many cases government is the only or the major institution for breeding varieties. Zimbabwe has some 11 companies and South Africa over 60 actively involved in local seed production and marketing. These data exclude distributors or agents of which there are over 800 in South Africa. The number of companies and coops that do variety trials follow the same trend, namely, government being the dominant role player in developing seed industries and most companies doing testing in developed industries. The aspect of extension services was not covered in this survey but the trend in developed seed industries is the private sector has largely taken over the extension role of government.

South African farmers have access to over 3500 plant varieties. Many of these are on official variety lists, while other are on industry lists. Since 1978 plant breeders' rights on new varieties have continued to grow and stood at 1807 varieties by end 2004. Some 39 per cent of these belong to South African private and public breeding institutions. Per crop group these PBRs number 236 varieties for 17 species of vegetables, 774 for 67 ornamental/flower species, 244 for 28 fruit species, 442 for 24 agronomic species, and 111 for 23 forage and pasture species.

### ***Experience in PVP***

It is not possible to define growth in PBR applications as resulting from the protection offered under PBR, or due to need to serve specific markets or to expand product ranges. It appeared clear from interviews that PBR protection, even if considered weak, is the major factor, especially for investing in breeding OP varieties. The benefits from an enabling environment for investment in plant breeding are shared between plant breeding institutions, farmers who can improve their production efficiency as result of higher yields and pest/disease resistance, and society that enjoys an ever expanding range of products with improved qualities.

Most private plant breeding companies refuse to make available their new varieties in countries that offer no legal protection against piracy. The intrinsic benefits from protection lies in facilitated access to international germplasm and parent lines for breeding, new varieties for meeting market requirements, as well as further breeding, and the opportunity to market South African varieties internationally. It is especially the multi-billion dollar fruit industry, being primarily export oriented, that is adamant that, without ongoing access to new varieties, their industry will have no future.

Patents on plant varieties have been used only for protecting the specific genetic modification technology, as plant varieties as such cannot be patented, or processes

for identifying, characterizing and producing new plant chemicals. Only a few trade marks have been registered for use on fruit varieties and somewhat more on ornamentals. No use has as yet been made of geographic indications.

Extensive use is being made in South Africa of material transfer agreements on varieties and germplasm made available for testing, followed by production and marketing contracts under licensing agreements. The agreements may involve licensing through a mediating party such as SANSOR for public ARC seed crop varieties or through SAPO for varieties of fruit, or direct licences with marketing companies. Contracts may involve only testing, seed production, exports, or international sub-licensing. Royalties may be based on seed sales or, in the case of fruit and flowers, on the plant material and the marketed product. The additional benefit of contracts is that it stands apart from IPR. In other words, it can be used to protect ownership before IPR is granted, after IPR has been exhausted, or even if the variety carries no IPR.

Enforcement of ownership of varieties is considered inadequate as it is left to the owner to monitor and police infringements of plant breeders' rights. Litigation is expensive. Some success has been achieved through contracting by SANSOR of monitoring services of a private party and some 19 cases were handled in 2004. The fruit industry can reduce unauthorized production and export by way of monitoring exports as specific exporters are contracted to handle specific varieties.

South Africa is in the process of harmonizing all IPR legislation and bringing in disclosure of use of indigenous knowledge. Such disclosure in applications will require details of prior informed consent and benefit sharing agreements.

South African plant breeders generally feel that PBR and other forms of protection are necessary, that it has stimulated investment and establishment of new enterprises, leading to a competitive industry that brings benefits not only to innovators, but especially to farmers and consumers. Seeds and plants are scale-neutral so that size of farming does not matter. IPR per se has not increased seed and plant prices as new, improved varieties sell at a premium due to their added value, but additional technology fees do increase the price of GM varieties. This is offset by increased production benefits. Breeders, companies and institutes expressed the need for SADC to harmonize IPR so that member states can have access to improved varieties. Use of contracts and licence agreements are valuable tools to retain control when varieties are released, but breeders showed little insight into new developments like use of patents, trade marks and geographic indications, as well as new biodiversity laws covering farmer and community rights.

The five SADC member states covered in this study—Angola, Malawi, Mozambique, Zambia and Zimbabwe—showed that very little progress has been made to develop harmonized IPR legal systems since establishment of ARIPO in 1978, except in the case of Zimbabwe. Malawi, Zambia, Mauritius, Tanzania and Mozambique all have draft plant breeders' rights bills in process. It appears that patents and trade marks legislation is outdated and that no use has been made of these for plant varieties. The use of geographic indications for indigenous food crops as a tool to protect and promote international marketing of indigenous products, has not been recognized.

Extensive use has been of mandatory variety lists required before marketing can proceed. The protection that these lists provide to breeders is minimal as little monitoring and policing by government take place. The range of varieties available to farmers seems to be related to the availability of protection of varieties which, in the case of Zimbabwe number over 300 varieties, while lists are still being compiled in Angola. The same trend is found in the number of seed companies with more than 30 companies active in Zimbabwe and probably less than 10 in each of the other countries studied. An active seed industry not only brings an increased range of varieties but also competitiveness that leads to improved varieties, quality and service, as well as price competition, all to the benefit of farmers.

Malawi, Zambia, Mozambique and Mauritius are moving on adopting plant breeders' rights and attention is being given to farmers' rights, land races and community rights. Zimbabwe has had plant breeders' rights for some 30 years but has not acceded to UPOV. It is clear that some use has been made in these drafts of the AU Model Law on intellectual property, firstly, in that some additional requirements relating to production have been included and, secondly, requirements related to compliance with the Convention on Biodiversity. In the first instance UPOV 1978 states clearly in Articles 6.2 and 14 that breeders' rights are independent of requirements related to production, certification and marketing and that the latter measures should not constrain granting of breeders' rights. UPOV 1991 states the same in Articles 5 and 18. In the first instance such additional measures should not be a pre-requisite for PBR and in the second instance it will be better to separate PBR from legislation dealing with access to plant genetic resources and indigenous knowledge. These three systems are based on different legal principles for eligibility of protection. However, it would be acceptable to include in application requirements for PBR the disclosure whether the source of the material from which a new variety had been bred, included use of land races or farmer selections. The risk is that, by including various issues in one piece of legislation, a country may not be able to comply with UPOV. The second problem could arise from SADC member states developing different requirements so that we miss the opportunity to harmonize legislation and this will not promote facilitation of access to new varieties and seed movement across borders.

### ***Impact of PVP***

One major objective of IPR studies of this nature is to evaluate the quantifiable impact that IP protection has had. All such previous studies had some difficulty to separate the effect of several factors, namely, a conducive government policy and regulatory framework for plant variety introduction, access to international germplasm, the opportunity to breed or introduce new varieties of OPs to extend product range of an enterprise, domestic or international market opportunities for varieties having specific traits, size of the agricultural industry, and availability and effectiveness of legal protection for breeders of new varieties. In SADC only Zimbabwe and South Africa have had long experience with PBR, which limits the comparisons.

Several measurable impacts were used to quantify IPR, taking into account that such data were also influenced by development levels of the respective seed industries. The countries were grouped on the basis of level of IPR legislation for plant varieties. Some data are summarized in Table 1 contained in Annex B.

Group A consists of Botswana, Lesotho, and Swaziland, all having no PBR legislation or draft.

Group B includes Angola and Namibia that have started with a first PBR draft.

Group C are countries with advanced or final PBR drafts and include the DRC, Mauritius, Mozambique, Zambia, Tanzania, and Malawi.

Group D covers Zimbabwe and South Africa that have had PBR for some years.

**Measurable 1: Size of seed industry.** No data were obtained from countries except that South Africa had a declared seed industry turnover of \$344 million in 2004, the biggest in Africa, while Zimbabwe also ranks in the top class.

**Measurable 2: Number of active seed producing and marketing companies:** This ranged from 2 to 5 on Group A, from 4 to 5 in Group B, from 2 to 15 in Group C, and from 20 plus to 65 in Group D.

**Measurable 3: Number of varieties on official lists:** Group A ranged from zero to 45, Group B from 7 to 40, Group C from 20 to 200, and Group D from 214 to 1978.

**Measurable 4: Number of varieties protected under PBR:** Zimbabwe's count is estimated at 50 and South Africa had 1807 at end 2004.

**Measurable 5: Total number of varieties available to farmers:** Most countries reported the number of listed varieties plus unknown additional varieties. The estimates for Zimbabwe and South Africa, are 300 plus and 3500 plus, respectively.

**Measurable 6: Number of plant breeding companies:** Group A ranged from zero, government only to 1, Group B government only, Group C from government only to 7 companies, and Group D from 11 companies, public institutes and university in Zimbabwe, to 22 seed companies, over 4 universities, 9 public institutions and scores of companies and semi-commercial breeders in the flower sector in South Africa.

**Measurable 7: Number of companies doing variety trials:** Only Swaziland reported 5 parties in Group A, Angola 6 and Namibia zero in Group B, 2 to 15 in Group C, and 25 to over 60 in Group D.

**Measurable 8: Financial benefits:** No data are available from country reports and feed-back, but some direct and indirect information is useful.

- **Direct foreign investment:** This was not quantified but since liberalization of seed industries all countries experienced entrance by private companies that brought investment to lesser or greater extent. In some countries this involved millions of dollars. The South African seed industry was driven by local companies and co-ops until the mid 1950s. Major foreign investment of tens of millions of dollars gained momentum during the last 15 years, bringing also advanced technologies and germplasm.
- **Crop production efficiency:** Plant breeding and access to improved varieties generally lead to increased yields per hectare. An 11-year study in Malawi showed that maize hybrids yielded more than double that of OP varieties. Zambia experienced maize yields from hybrids of up to 8 tons per hectare under irrigation. Zimbabwe was a leader in introducing single cross maize hybrids. Average South African maize yields remained static from 1910 to 1950 and thereafter increased six-fold to 2005. Breeding contributed some 36

per cent of this increase. Average wheat yields increased five-fold during this period. Breeding and access to improved varieties play a major role and plant variety protection, though not quantifiable, strengthens investment in breeding.

- **Benefits for farmers:** In 1994 the added farmer benefit of increased South African maize yields due to breeding was estimated at \$200 million per year. Locally bred peach, plum and apricot varieties protected under PBR contributed \$160 to exports in 1993. At present this may be 10 times more. Introduction of the Australian apple Pink Lady, added direct profits of \$10 million for farmers. Without PBR this variety would not have been licensed. In Zimbabwe, Zambia, Uganda and Kenya farmers benefit from export of cut flowers, all controlled under strict contracts. More opportunities can arise if protection is strengthened by PBR.
- **Export earnings:** Most SADC countries can benefit from producing and exporting seed. Zambia has been exporting several thousand tons of seed in 2005, Zimbabwe has a long track record as a major exporter, and South Africa exported over 21 000 tons worth an estimated ZAR500 million (\$80 million) in 2004. Much of this goes into Africa in the form of hybrid or commodity OP seed, the balance is made up of improved varieties and hybrids under contract for foreign companies. Multiplication of foreign varieties for export requires protection and strict adherence to contracts. Most companies will not sell new varieties in countries where there is a danger of alienation. Biotech companies will not make available GM seed for testing or sales unless importing countries have biosafety systems and IPR in place. The potential for producing off-season seed for the northern hemisphere and for regional trade to alleviate periodic seed shortages will be boosted with proper IPR systems and quality seed certification.

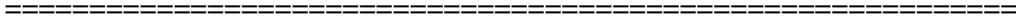
Although available data do not enable an analysis of the direct beneficial impact of plant variety protection systems, it is clear that PVR remains a major factor. The South African fruit industry is adamant that their multi-billion dollar exports are based on improved varieties and that access to these is underpinned by PVP. Breeders generally agree that PVP boosts investment in breeding. Seed companies interviewed have a policy that they will rarely make available seed of proprietary OP or self-pollinated varieties for testing and marketing in countries that do not provide protection.

## RECOMMENDATIONS

Recommendations can be summarized as follows:

9. The message should be conveyed to senior policy makers and politicians that, although compliance with WTO-TRIPS requires an effective IPR legal system for plant varieties, it is in the interest of member states, their agricultural-based economies, communities and consumers, to protect their own innovations, plant genetic resources and community rights under legal systems, while improving access to new, improved foreign varieties.
10. Furthermore, it should be conveyed that providing legal protection for innovation by plant breeders, farmers and communities, will stimulate further research, development and innovation, with concomitant benefits for the economy and society at large. The counter side is that Africa will continue to depend upon foreign bred varieties of which only old varieties will be accessible, while African varieties and indigenous food crops will remain open to piracy.
11. While it is necessary to make provision for farmers' rights and indigenous knowledge as required under the CBD, these systems of protection rest on different legal bases and should be handled separately from PBR, patents and trade marks. At the same time one cannot strengthen one system of protection by weakening another.
12. It should be acceptable that disclosure of origin or source, as required in application for plant breeders' rights, could include disclosure of use of farmer varieties and land races, and management of benefit sharing can be handled under other legislation.
13. Requirements for production, certification and marketing are matters falling under seed trade regulation and management and should not form part of requirements for IPR but can be handled separately.
14. SADC member states are in the process of developing plant breeders' rights bills but it is not clear what coordinating role ARIPO is playing. Efforts should be made to have a common harmonized approach on basic requirements for IPR systems.
15. It is recommended that plant breeders' rights be modelled after the UPOV system as some 100 countries individually or as members of regional blocks, are already subscribing to UPOV standards and there is no reason why Africa should develop systems that are at variance with those of the rest of the world. The 16 West African member countries of the OAPI Accord de Bangui will join UPOV as a regional block, effective on 1<sup>st</sup> January 2006. Eligibility for protection can be qualified in terms of no variety can enjoy both PBR and Farmers' Rights, although different requirements for the two systems will in practice preclude dual protection.
16. Patent legislation should be modernized to include reference to plants and should harmonize with that in most countries, namely, that a plant variety and natural biological processes cannot be patented but that specific processes and innovations on plants are eligible. It will be a sad day if patents are totally excluded, leaving innovation on medicinal plants unprotected and open to piracy.

17. Trade Mark legislation should qualify that marks are eligible for protection, as long as such marks are not used as variety names.
18. Provision for protection of land races, farmer selections and community/indigenous knowledge can only be implemented if documented and if plant selections are collected, described, catalogued, and maintained in gene banks. Where ownership is uncertain, government should act as custodian.
19. The delays in drafting and/or modernizing IPR legislation in SADC remain a cause for concern. It is proposed that a task team be established to collaborate with ARIPO in assisting national governments to expedite the legal process. ARIPO can serve as the regional office for PBR applications. At the same time such a task team can assist with capacity building in regulators, as well as public and private breeders.



## ANNEX I

### TABLE 1: COUNTRY SURVEY

<b>Country</b>	<b>Status PBR</b>	<b>Vart List</b>	<b># Varieties on List</b>	<b># with PBR</b>	<b># Seed Prod &amp; marketing</b>	<b># Breeding Co</b>	<b># Co Trials</b>
Angola	1st Draft	Unofficial	40	0	5	Gov	6
Botswana	?	?	?	?	2		
DRC	Final Draft	Yes		0	8	Gov	3
Lesotho	No	No	-	-	4	Gov	Gov
Madagascar	?	?	?	?	?	?	?
Malawi	Draft to UPOV	Yes	104	0	8	2	5
Mauritius	Draft						
Mozambique	Draft, comment	Yes	158	0	2	3	2
Namibia	Draft Policy	Unofficial	7	0	4	Gov	Gov
South Africa	Yes	Yes	2004	1807	65	22+13+more	65+
Swaziland	No	Yes	45	0	5	1	5
Tanzania	Yes	Yes	?	?	?	?	?
Zambia	Final Draft, comment	Yes	200+	0	15	7	15
Zimbabwe	Yes	Yes	214	50+	20+	11	25

## ANNEX II

### LIST OF PARTIES CONTACTED / INTERVIEWED

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## ANNEX III

### DOCUMENTS CONSULTED

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2. African Union Model Law on IPR
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