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# 23 To Sow or Not to Sow: Dilemmas in Creating New Rights in Food

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## Abstract

This chapter examines the obligations in Trade-Related Aspects of Intellectual Property Rights (TRIPS) with respect to introducing plant breeders' rights (PBRs) in developing and least-developed nations. Furthermore, it studies the effect of introducing plant variety protection (PVP) in the context of other policies that impact agriculture. Without addressing directly whether protection of PBRs is justified, this chapter makes two arguments. First, the flexibility embedded in art. 27.3 of TRIPS to adopt *sui generis* systems of protecting PBRs will be defeated if International Union for the Protection of New Varieties of Plants (UPOV) is deemed to be either a mandatory requirement or if UPOV establishes the minimum standards for a *sui generis* PBRs system because UPOV is an ineffective mechanism for protecting plant varieties. Second, notwithstanding UPOV, agricultural subsidies will offset any benefits likely to flow to nations introducing PBRs. The effect of agricultural subsidies can be detrimental to the prevailing economic conditions in nations that newly introduce PVP. The immense shortage of food in some developing nations creates the need to be cautious before introducing any mechanism that may upset the status quo. The chapter concludes that for developing nations to accrue meaningful benefits, reforms in agricultural subsidies should precede introduction of PBRs. Developing nations, considering the 2005 deadline for TRIPS compliance, should seek an extension of the transitional period for compliance with the PVP requirement under art. 27.3 until completion of the negotiations of the Cancun issues on agriculture.

## Introduction

The Uruguay Round<sup>1</sup> is generally identified as an instrument that pressured the developing world into adopting a trade regime by setting a deadline under the Trade-Related Aspects of Intellectual Property Rights (TRIPS) Agreement.<sup>2</sup> Agricultural

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issues, however, have required the developed world to introduce new reforms and to accommodate international trade (The Cancun Challenge, 2003). The lavish support that developed nations provide for farmers results in depriving a fair market to their counterparts in developing nations. Such deprivation affects the economies of developing nations (Napoleon's Bittersweet Legacy, 2003). The commitment developed countries have displayed to ensuring worldwide patenting in pharmaceuticals has led to the assumption that the rationale of the developing world's arguments, with respect to eliminating agricultural support in the form of subsidies, would be well received. Instead, the developed nations have shifted attention from agricultural subsidy reforms to art. 27 of the TRIPS Agreement. Leaving agricultural subsidy issues to the important context of the implementation of the World Trade Organization (WTO) Agreement on Agriculture (AOA, 1994), developed countries have argued that flexibilities for plant breeder's rights (PBRs) in art. 27.3 of TRIPS require either patenting plant varieties or embracing the *sui generis* system in UPOV (1991).

This chapter is unique in examining the obligations in TRIPS in the context of other issues that impact agriculture, particularly subsidies. Thus, after detailing a background of plant variety protection (PVP), the second section outlines the obligations in TRIPS with respect to introducing PBRs in the developing and least-developed nations (hereinafter, developing nations). The third and fourth sections address two distinct but related issues. The third section establishes that UPOV is not the 'effective' *sui generis* mechanism that TRIPS contemplates for protecting plant varieties because: (i) the relevant history clarifies that TRIPS does not designate UPOV as the *sui generis* system; and (ii) UPOV is an ineffective mechanism for protecting plant varieties. UPOV's inefficiency is exemplified by the diluted eligibility requirement for protection, an exaggerated scope of protection and limited restrictions on the rights of the owner. Thus, the flexibility to adopt *sui generis* systems of protecting PBRs embedded in art. 27.3 of TRIPS will be defeated if UPOV is deemed either to be a mandatory requirement or the minimum standards for establishing a *sui generis* PBRs system.

The fourth section examines whether rewarding creativity in plant breeding by introducing PVP – UPOV-based or otherwise – would achieve its objective given that agricultural subsidies have foreclosed the international commodity market. This part argues that agricultural subsidies will offset any benefits likely to flow to nations introducing PBRs. Instead, the effect of agricultural subsidies can be detrimental to the economies of countries that newly introduce PVP. In order for developing nations to accrue meaningful benefits, reforms in agricultural subsidies should precede introduction of PBRs. The immense food shortage in some developing nations creates the need to be cautious before introducing any mechanism that potentially upsets the status quo.

Hence, developing nations should push for reforms in agricultural subsidies as a precondition to fulfilling their obligations relating to protection of plant varieties under art. 27.3 of TRIPS. Considering the 2005 deadline for TRIPS compliance, developing nations should seek an extension of the transitional period for compliance with the PVP requirement under art. 27.3 until resolution of the agricultural subsidies issue.

## Background of TRIPS Obligations

The following subsection sets the background for introducing PBRs. It outlines the developing nations' concerns in the context of PBRs' potential benefits. It also discusses the members' obligations and flexibilities in art. 27.3 of TRIPS with respect to introducing PBRs.

### Potential benefits of plant breeders' rights

The introduction of PBRs was meant to reduce one of the barriers to international trade in agriculture by opening up developing country markets to hybrids. PBRs, by increasing agricultural investments, can result in high-yielding, newer hybrid varieties or genetically modified plant varieties, otherwise generally unavailable in developing nations. Hybrid varieties have the capacity to eliminate traditional deficiencies in agriculture that induce an element of unpredictability in farming by introducing traits for pest resistance, weather resistance and improved yield cycle. The advantages for the farmers are compounded when the higher yield per acre of the produce is combined with hybrid traits. Such improved varieties of produce can increase the marketability of the yield, thus benefiting the farmers. Ultimately, consumers may benefit from the resulting varietal diversity of crops.

Viewed in the context of the developing world's lack of access to sufficient food, the potential benefits of PBRs to increase food production and alleviate hunger cannot be discounted (Pinstrup-Andersen and Pandya-Lorch, 2000). Malnutrition causes approximately 6 million deaths of children aged less than 5 years every year in developing countries (The Silent Emergency, 1998). In addition, micronutrient deficiencies (especially vitamin A, iodine and iron) are widespread in developing nations (The Silent Emergency, 1998). Thus, between maintaining the status quo and introducing PBRs, the latter may enable access to food in developing countries provided the risks are appropriately allocated (Transgenic Plants and World Agriculture, 2000).

Despite the benefits, introducing PVP was one of the most debated items in the TRIPS Agreement. As a mark of the debate, the countries involved specifically slated art. 27.3 for review after 5 years (in 1999) from the enforcement of the agreement (in 1994). During the TRIPS negotiations, the USA encouraged patent protection of plants (GATT Secretariat, 1990). Japan, along with the USA, opined that PVP was indispensable for encouraging new technological solutions in agriculture (WTO Council for TRIPS, 2002). Developments in genetic technology accentuated the need to reward creative plant breeding (WTO Council for TRIPS, 2002). The European Union (EU), however, argued that plant varieties should be excluded from patent protection (GATT Secretariat, 29 March 1990 and 14 May 1990). Developing nations supported the European position on the basis that PVP would detrimentally affect national goals of poverty and hunger eradication (GATT Secretariat, 29 March 1990 and 14 May 1990).

### Concerns of developing nations

Developing nations underscored several factors necessitating a national regime for PVP rather than adopting a system similar to the protection prevalent in developed nations. First, in developing nations agriculture has a close nexus with the national economy. Compared with developed nations, the agricultural population is higher in developing nations. For example, the Food and Agriculture Organization (FAO) estimates the agricultural population for 2000 in developed nations at 99,752,000 against a population of 2,473,704,000 in developing nations and 467,339,000 in least-developed nations (Agricultural Data, 2004). Agriculture employs >70% of the labour force in low-income countries, 30% in middle-income countries and only 4% in high-income countries (UNCTAD, 1999). Thus, agriculture remains the main source of income for the general population in low-income countries. The augmented agricultural population in developing countries increases the economy's dependency on agriculture. Between 1990 and 1996, the agricultural contribution of the gross domestic product (GDP) was on average 34% for low-income countries as compared with 8% for upper middle-income countries, and 1.5% for the high-income countries of the Organization of Economic Cooperation and Development (OECD) (Negotiations on WTO Agreement, 2001). Economic surveys from Kenya demonstrate the nexus between agriculture and the national economy; the GDP and agricultural growth in Kenya were, respectively, 3.0% and 2.8% in 1993/94; 4.6% and 4.4% in 1995/96; and 1.8% and 1.5% in 1997/98 (N'gera, 2003). The economic dependence differentiates the agricultural sectors of developing nations from those of the developed nations. The differences include smaller landholdings and labour-intensive agricultural practices (Negotiations on WTO Agreement, 2001). A majority of farmers in countries like India practise subsistence land farming, and only marginally participate in international trade. Developing nations opine that the distinguishing features of agriculture and its impact on their economies necessitate prioritization of national goals when introducing PBRs.

Second, developing nations are sceptical of the inevitable process of privatization that results from PVP. In advocating PBRs, the TRIPS objective is to increase innovation in plant breeding through private investments. Developed nations, particularly the USA and Japan, outline PBRs' ability to increase private research and development (R&D) investments that can lead to improved varietal diversity. Developed nations argue that increased research in agriculture can benefit the food shortage issues of developing nations. Hence, these nations tout PBRs' ability to improve agricultural production. Developing nations, however, outline a range of issues that can emanate from privatization. These issues range from social and economic factors to the impact of privatization on biodiversity. In particular, developing nations reflect the concerns portrayed in the following subsections.

#### *Plant breeders' rights by themselves will not necessarily increase investments in food*

Economic analysis like the Butler and Marion report concedes that the privatization from introducing PBRs cannot singularly trigger an increased R&D investment (Butler and Marion, 1985). Other studies determine that R&D investments

in agriculture are dependent on factors extraneous to breeding like profitability of crops, market size and capital intensiveness. For example, the public key infrastructure (PKI) – a research database – outlines an increase in R&D expenditures of wheat and soybean from 5% and 1%, respectively, in 1965 to 10% in 1979 (Perrin *et al.*, 1983). The database, however, attributes the increased investment for wheat and soybean as 29% and 89%, respectively, to the fragility of the soybean germ that makes it impossible for farmers to reuse the seeds (Butler and Marion, 1985). Moreover, on the demand side, soybean occupies an important, if not central, position in the ‘power farming’ techno-economic base of US agriculture (Butler and Marion, 1985). Thus, independent of other factors like fluctuation of supply and demand (e.g. changing acreage and increasing crop profitability), improvements in breeding techniques and use of computer-based systems for information processing and monitoring, studies are inconclusive as to whether PBRs alone can contribute to agricultural investments (Butler and Marion, 1985). Studies like the Dwijen report postulate that PBRs’ dependence on extraneous factors to improve investments strengthens existing private market players with no benefit for new entrants (Rangnekar, 2000). Developed nations counterargue, using the increased soybean investment as an example, that any equivalent or proportional investment in developing nations on food, irrespective of the reasons, would be beneficial.

*Modernization of agriculture will affect welfare activities of the state*

Private investments from PBRs will inevitably lead to modernizing agriculture. While acknowledging its benefits, developing nations express concern that modernization of agriculture will affect small-scale farmers by widening the gap between the rich and the poor. Consequently, such modernization will result in more welfare issues. Hence, developing nations primarily underscore that internationally harmonized PBRs regimes should incorporate flexibilities to balance local welfare issues. Most developing countries already face welfare issues in scales currently unknown in the developed world. Moreover, the differences in agriculture between the developed and developing world result in these issues being unique to the latter. For example, the introduction of the Green Revolution, a movement to increase the yield per acre of certain crops like rice and wheat, fulfilled the promise of high-yielding varieties. It resulted, however, in other social issues for developing nations. Studies conducted after the Green Revolution indicate that the landlords were benefited more than the peasants, leading to social tensions (Brush, 2001). Furthermore, small-scale farmers suffered a variety of economic and social woes including lower wages, displacement from the land, loss of employment and higher rents (Brush, 2001). The studies reflected a bias in the diffusion of improved varieties, which resulted in huge benefits to the large-scale farmers and meagre benefits to the small-scale farmers (Brush, 2001). Consequently, small-scale farmers received a disproportionately small share of the benefits from the new technology. The possible negative social influence from the Green Revolution was unknown before its introduction because of the lack of nation-specific studies in the developing world. Several nations propound the same or similar concerns regarding the introduction of PBRs. Generally, PBRs’ proponents assume or assert that developing nations will benefit simply because

developed nations have benefited. Developing countries' argument at the WTO emphasized that the lack of specific studies denied them the benefit of being proactively equipped to tackle issues that may result from introducing PBRs.

*Resulting private sector investment from PBRs will cater to consumer-oriented foods rather than foods for the poorer sections of the population*

Currently, developing nations engage in innovative plant breeding through government-funded public institutions. The public-funded research activities concentrate on staple food crops rather than on consumer-oriented research to achieve national goals like access to food and poverty eradication. Private investors, however, will not benefit from PBRs unless research is directed towards crops with greatest profit potential. Hence, private R&D investments would cater to consumer foods rather than staple foods. Developing nations emphasize that private support could unduly influence a public R&D agenda. A shift in the goals of agricultural research may not cater to the welfare necessities of developing nations, even if agricultural production increases. Specifically, public research programmes could be disproportionately leveraged towards private industry goals, rather than towards broader interests of farmers or consumers (Klotz-Ingram and Day-Rubenstein, 1999). Klotz-Ingram and Day-Rubenstein highlight a study of barley research conducted by Ulrich *et al.* (1986) in Canada, which found [AU1] that when brewing and malting companies increased their financial support for public barley research, the emphasis was on improving malting quality rather than increasing yields (Klotz-Ingram and Day-Rubenstein, 1999). According to the study, higher-yielding varieties would have benefited livestock producers (Klotz-Ingram and Day-Rubenstein, 1999). While both the public and private sectors gained from the joint research, the study concluded that the social cost of private assistance was high (Klotz-Ingram and Day-Rubenstein, 1999).

*Effect on biodiversity*

The concentration of the world's biodiversity is more in developing nations. The nine major natural diversity centres are Ethiopia, the Mediterranean, Asia Minor, Central Asia, India-Burma, China, Siam-Malaysia-Java, Mexico-Guatemala and Peru-Ecuador-Bolivia (Starr and Hardy, 1993). Private investments in biodiversity-rich nations have led to bioprospecting, which involves screening the biological diversity for commercially valuable genetic and biochemical resources. Bioprospecting arguably results in commercializing access for biodiversity, and thus creates an incentive for developing countries to preserve their flora and fauna. Supporters of bioprospecting argue that it enhances biotechnology and agricultural productivity. On the other hand, developing nations argue that biotechnology can lead to monocultures divorced from 'nature', which historically has destroyed biodiversity by resulting in unintended consequences such as soil erosion (Horsch and Fraley, 1998). Developing nations, while aware that aggressive private sector bioprospecting can deplete biodiversity resources, are keen on capitalizing from the growth of the biotechnology industry that relies increasingly on biodiversity. Hence, these nations prefer flexibility to introduce a nation-specific PBRs regime that advances their national agendas with reference to the use of biodiversity materials.

### Legal obligations under art. 27.3 of TRIPS

The WTO Secretariat document reviewing art. 27.3(b) appreciates the differences in member's opinions on the PBRs issue. Consequently, according to art. 27.3(b) of TRIPS: '[M]embers shall provide for the protection of plant varieties either by patents or by an effective *sui generis* system or by any combination thereof.' Thus, the article obligates members to effectively protect plants without setting substantive standards for such protection. By leaving the term 'plant variety' undefined, TRIPS implies effective protection of all plant varieties. The effective protection can be made by any one of the regimes mentioned in art. 27.3 of TRIPS, being patents, or a *sui generis* mechanism or a combination of both patents and the *sui generis* mechanism (TRIPS, 1994, art. 27.3). TRIPS generally establishes minimum standards of protection, but, vis-à-vis plant varieties, it merely requires countries to provide any one of the three broad forms of the outlined protections. Thus, art. 27.3 is unique in not harmonizing the plant variety regime. Harmonization requires a certain degree of uniformity that would be impossible to achieve considering the flexibilities embedded in the article. The highlight of art. 27.3 of TRIPS is the flexibility that provides members the luxury of determining appropriate national PVP regimes. In doing so, art. 27.3 accommodates national priorities in protecting plant varieties (Halewood, 1999; Bodeker, 2003). It enables countries that question the assertions of developed nations on the benefits of PBRs or, alternatively, the applicability of the studies conducted elsewhere to their national conditions, to tailor a protection regime for plant varieties based on national requirements.

Further flexibility in the art. 27.3 language can be found in the use of the expression 'an effective *sui generis*' system (as opposed to 'the effective'). The language allows nations to determine the type of *sui generis* system to protect plants (Halewood, 1999; Bodeker, 2003). Moreover, the *sui generis* option allows countries to promote innovative plant breeding while preserving genetic biodiversity and traditional forms of farming. The TRIPS requirements for PVP would be satisfied if the national systems for PVP possess characteristics that generally apply for protecting real property (Council for TRIPS, 2002). Thus, TRIPS does not harmonize PVP, but merely requires that one of the article's broad forms of protection covers plant varieties.

#### *Constituents of an effective sui generis system*

TRIPS does not define the term 'effective', although art. 27.3 envisages an effective system for protecting plants (TRIPS, 1994). TRIPS uses the adjective 'effective' to signify an enhanced efficiency requirement in conjunction with the establishment of rules and procedures of intellectual property rights (IPRs). The term serves as an indicator of the strength required of the rules and procedures to achieve the stated objective. Developed nations have generally opined that the efficiency of a system to protect plants is determined from the sufficiency of protection (Council for TRIPS, 2002).

Furthermore, the Doha Declaration, which was signed on 11 November 2001, establishes an objective-based reading of all the articles in TRIPS. The Ministerial Declaration, in para 19, details that in reviewing art. 27.3(b) on PVP, 'the TRIPS Council shall be guided by the objectives and principles set out in Articles 7 and

8 of the TRIPS Agreement and shall take fully into account the development dimension'. Similarly, the Declaration on Public Health in para 5(a) asserts that '[i]n applying the customary rules of interpretation of public international law, each provision of the TRIPS Agreement shall be read in the light of the object and purpose of the Agreement as expressed, in particular, in its objectives and principles' (Doha Declaration, 2001). Thus, in subjecting TRIPS to an objective-based interpretation, the Doha Declaration establishes 'the right' of the members to interpret the TRIPS obligations in light of the public policy objectives in arts. 7 and 8. Article 33 of the Vienna Convention, which requires that treaties be read in the light of their objectives and purposes, further supports this interpretation of TRIPS, as advocated by the Doha Declaration (Vienna Convention, 1969).

The 'objectives' of TRIPS, as detailed in art. 7, provide that 'protection and enforcement of intellectual property rights should contribute . . . to a balance of rights and obligations' of members in a manner conducive to 'social and economic' welfare. The principles under which the objectives of art. 7 function are discussed in art. 8. Entitled 'Principles', art. 8 recognizes members' rights to adopt public health and public interest measures, provided that such measures are consistent with the provisions of TRIPS. The requirement in art. 7 that IP mechanisms should contribute 'to balancing the rights and obligations of *members*' read with the Doha Ministerial Declaration's assertion on the developmental dimension in arts. 7 and 8 lends a national, instead of global, standard to the TRIPS objectives. Article 7 details that the objective of enforcing IP mechanisms is to balance individual member's rights and obligations. National goals, as opposed to global goals, characterize the objectives set forth in art. 7. Considering that the objectives of TRIPS are based on a national standard, the *efficiency* of a system established under art. 7 cannot be judged on a global standard. The lack of global minimum standards for PVP furthers the view that effectiveness of a PBRs regime cannot be determined on a global standard. Presumably, in light of arts. 7 and 8 of TRIPS, the *effectiveness* of a PBRs regime will be judged by its ability to accommodate national goals and will be based on national standards. Hence, PBRs regimes established under art. 27.3, when read with arts. 7 and 8, should be conducive to national social and economic welfare.

The ability to identify and protect creativity in plant breeding, while at the same time accommodating national goals, is the primary requirement of an effective PBRs regime under art. 27.3 read with arts. 7 and 8 of TRIPS. When art. 27.3 is subject to an objective-based interpretation under art. 7, it results in two distinct advantages by: (i) increasing flexibility for developing nations; and (ii) indirectly creating a national yardstick based on arts. 7 and 8 of TRIPS to measure the efficiency of any PBRs regime. Thus, developing countries can weigh the benefits of PBRs in the context of their unique socio-economic issues to accommodate public health or public interest exceptions. Thus, developing countries can establish a *sui generis* PBRs regime that eliminates or reduces adverse welfare effects.

[AU2]

## Is UPOV an Effective *Sui Generis* System?

Developed nations acknowledge that art. 27.3 of TRIPS provides a choice between patenting and a *sui generis* system for protecting plants. Developed nations, how-

ever, construe UPOV as a minimum standard for establishing a *sui generis* system (Grain, 1999; UPOV Position, 2000). The following two sections discuss whether the reference to an effective *sui generis* system in art. 27.3 of TRIPS is a reference to UPOV. The first argues that historically UPOV was never construed as the minimum standard under TRIPS. Moreover, construing UPOV as the mandatory minimum standard defeats the purpose of flexibilities in art. 27.3 of TRIPS. The second establishes that UPOV is not an effective *sui generis* system as required under art. 27.3 of TRIPS considering (i) diluted eligibility requirements; (ii) exaggerated scope of breeders' rights; and (iii) inadequate restrictions on breeders' rights.

### UPOV and art. 27.3 of TRIPS

Article 27.3 of TRIPS does not in any way refer to UPOV as the minimum standard for establishing a *sui generis* mechanism. The article language that members can protect plants using 'an effective *sui generis*' system rather than 'the *sui generis*' system lends credence to the argument that UPOV was not intended as the *sui generis* system in TRIPS. Furthermore, when relying on other international treaties, TRIPS specifically refers to them such as the Paris and the Berne Conventions (TRIPS, 1994). In light of these specific treaty references, there is arguably no reason for the TRIPS text to exclude reference to UPOV in art. 27.3, especially if the negotiators had intended otherwise. The discussions in the WTO Secretariat document highlight why UPOV was not specifically designated in TRIPS as the *sui generis* system (Council for TRIPS, 2002). Switzerland and the USA asserted that the limited geographic coverage of UPOV at the time of the TRIPS negotiations precluded specific inclusion in art. 27.3(b) (Council for TRIPS, 2002). Members lacked the confidence that UPOV would be widely adopted and hence refrained from specifically referring to it in art. 27.3. Considering that members were uncertain of UPOV's wide adoption in the future, it is doubtful that TRIPS envisaged the former as the minimum standard for a *sui generis* system.

Moreover, the WTO review of art. 27.3 of 2002 reflects a lack of consensus among members vis-à-vis the incorporation of UPOV (Council for TRIPS, 2002). For instance, developed nations therein acknowledge the prevalence of *sui generis* systems other than UPOV and agree to determine the effectiveness of such systems on a case-by-case basis (Council for TRIPS, 2002). Thus, it is unlikely that in 1993 TRIPS designated UPOV as the effective *sui generis* system.

At the time TRIPS was negotiated, the 1978 text of UPOV was in force. This text of UPOV specifically denies 'double patenting' or combining protection using patents with a *sui generis* system (UPOV, 1978). Article 2(1) of the 1978 text of UPOV, read with the 1961 text of the treaty, specifically prohibits double patenting by providing that:

[E]ach Member State of the Union may recognize the right of the breeder provided for in this Convention by the grant either of a special title of protection or of a patent. Nevertheless, a member State of the Union whose national law admits of protection under both these forms may provide only one of them for one and the same botanical genus or species.'

(UPOV, 1978)

Article 27.3 of TRIPS, however, specifically provides for protection by combining both patents and a *sui generis* system. Thus, TRIPS does not prohibit the protection of the same species by a combination of regimes. For example, the US Supreme Court specifically allowed protection of the same species using a utility patent and a *sui generis* form of protection in *J.E.M. AG Supply, Inc. v Pioneer Hi-bred International, Inc.* (1994). It is unlikely that TRIPS, an agreement that allows overlapping protection, would refer to a treaty that specifically prohibits such overlap (Bai, 1997). In response, critics point out that UPOV's 1991 amendment (before the TRIPS Agreement was signed) eliminated the double patenting prohibition and thereby integrated UPOV with TRIPS. The history behind UPOV amendments, however, indicates that the 1991 amendment resulted from a misinterpretation of the double patenting prohibition clause. The drafters of the Convention on the Unification of Certain Points of Substantive Law on Patents for Inventions (Strasbourg Convention, 1963) misconstrued the provisions of the 1978 UPOV as prohibiting plant patents (Bai, 1997). Following this, the European Patent Convention (EPC) excluded patenting of plants (Bai, 1997). Consequently, UPOV was amended in 1991 to clarify that contracting parties should 'grant and protect breeders' rights' (UPOV, 1991). Thus, historically, the UPOV amendment was not intended to synchronize with art. 27 of TRIPS. [AU3]

The distinctive feature of art. 27.3 of TRIPS is its lack of minimum standards. In light of the art. 27.3 flexibilities, treating UPOV as the mandatory standard defeats the purpose of the TRIPS art. 27.3. Showcasing UPOV as the mandatory requirement deprives members of the *sui generis* option in art. 27.3 of TRIPS. Such a construction violates the spirit of art. 27.3. The flexibilities of a *sui generis* system are meant to accommodate national requirements. If UPOV is construed as the sole *sui generis* system, members will be forced to adhere to a set of minimum standards. Reading a requirement of minimum standards under art. 27.3 undermines the flexibility to protect plant varieties. Such standards indirectly force members to provide more extensive protection than required under the TRIPS language. Any construction of art. 27.3 which mandates that members provide more extensive protection than envisaged by the language violates art. 1 of TRIPS (1994).

### **UPOV is not an effective *sui generis* system**

UPOV cannot be construed as the mandatory standards for a *sui generis* system because it cannot meet the effectiveness requirement detailed under art. 27.3 of TRIPS. UPOV is deficient in accommodating national goals since it does not balance the interests of breeders with other interests vital to developing nations such as those of farmers. The deficiencies in UPOV are found in: (i) diluted standards for eligibility for protection; (ii) excessive scope of breeders' rights; and (iii) inadequate restrictions on breeders' rights. Consequently, UPOV preserves miniscule improvements as breeders' rights and grants rights that are disproportionate to the creativity in plant breeding. The deficiencies of UPOV enable a breeder to appropriate from the public domain, thus harming the genetic diversity. Developing nations view genetic diversity as a vital part of their social and economic structure.

Developing countries should avoid these inherent deficiencies in UPOV when establishing a *sui generis* system.

### *Eligibility for protection*

UPOV vests breeders' rights on new, distinct, uniform and stable varieties. Article 6 of UPOV deems a variety as 'new', provided that, 'at the date of filing of the application for a breeder's right, propagating or harvested material of the variety has not been sold or otherwise disposed of to others, by or with the consent of the breeder, for purposes of exploitation of the variety' (UPOV, 1991). Thus, novelty is determined solely by prior sale or disposal of the application material. Public knowledge is not a bar to determine whether a variety is new. Similarly, plants already cultivated or discussed in reference collections or in publications will qualify as new varieties. Varieties already known may still become eligible for protection as new variety.

A variety fulfilling the novelty test should still be distinctive, stable and uniform to be eligible for protection. Under art. 7 of UPOV, a variety is distinct if 'it is clearly distinguishable from any other variety whose existence is a matter of common knowledge at the time of filing the application' (UPOV, 1991). Under art. 14 of UPOV, a variety is 'a matter of common knowledge' if it has been the subject 'of an application for the granting of a breeder's right' or 'has been entered in the official register of varieties, in any country' (UPOV, 1991). Thus, the only feature required to qualify as distinctive is the ability to be distinguished from another variety either entered in the official register or for which an application has been made.

Interestingly, application material that is well known or is itself a matter of common knowledge (including by prior registry or application for PBRs) can pass the test of distinctiveness, provided the material is distinguishable from another that is a matter of common knowledge. Hence, common knowledge of the application material does not affect the distinctiveness of the variety. That the application material is indistinguishable from materials commonly cultivated or that are well known is not a bar to distinctiveness. Both commonly cultivated and well-known varieties (even if commonly known) that are indistinguishable from other well-known species will continue to qualify as 'distinct' so long as closely related varieties have not themselves become commonly known by registry or by application for breeders' rights. Thus, the distinctiveness requirement in UPOV is a highly diluted version of the novelty and non-obviousness requirements of the utility patent system. This results in allowing both well-known varieties and those trivially different from them to be considered distinct. In essence, a commonly cultivated and well-known variety can be novel and distinct under UPOV, provided it has not been sold or disposed of, and is distinguishable from other varieties that appear in a registry or for which an application has been made.

For example, berry A is a commonly cultivated plant in remote parts of the world, and it can be deemed new provided it has never been disposed of or sold. That berry A is commonly exchanged between people will not bar novelty. For example, the tulsi plant is a commonly found herb in India. Owing to its abundant availability, it is rarely sold, although it is commonly found in most backyards. Similarly, because of social faiths and beliefs, tulsi plants and leaves are commonly exchanged between people. Hence, under UPOV, tulsi will be qualified as new.

Berry A will also qualify as 'distinctive' under art. 7 of UPOV provided it is distinguishable from a variety for which an application has been made or has been entered in the official register. Berry A will pass the distinctiveness test even if it is indistinguishable from a commonly cultivated and well-known berry B, provided no application for protection or registry has been made for berry B. In essence, common knowledge, use or even cultivation of the application material is not an impediment for qualifying as new and distinct under UPOV. The current definition of distinctiveness in UPOV enables breeders to protect known varieties of plants that farmers have cultivated or used for a long time. The low standard for distinctiveness in UPOV allows miniscule innovations in plants to be elevated to the level of an invention. Protecting miniscule innovations results in unjust enrichment to the breeders and depletes prior art, which in this case is biodiversity material. Breeders may, in essence, monopolize genetic material from the public domain and protect such material as a premium innovation.

Attempts to monopolize well-known varieties and the resulting deprivation from the public domain are already rampant. The patenting of ayahuasca, a brew known as the yage or yaje in Colombia, Ecuador, Peru and Brazil prepared from a plant called the *vine banisteriopsis caapi*, serves as an example. US Plant Patents 5751 and 5752 (issued on 17 June 1986) on Ayahuasca to Loren Miller of the International Plant Medicine Corporation were revoked in 1999 (Long and D'Amato, 2000). The patents on turmeric and neem, both used in India for several years, substantiate the need to plug loopholes that enable protecting well-known varieties. These loopholes in UPOV showcase its inability to appropriately identify creativity in plant breeding. The loopholes skew UPOV towards breeders to the detriment of farmers' rights, which are of significant importance for developing nations. That some or all of these patents may be revoked on appeal does not negate UPOV's highly diluted eligibility requirements. Furthermore, the transaction costs and economic resources required from already poor economies for the appeal processes to revoke protection of biodiversity materials can be avoided if UPOV's eligibility requirements are strengthened. Thus, the loopholes demonstrate UPOV's inability to be 'an effective *sui generis*' system as required under TRIPS. [AU4]

#### *Convention on Biological Diversity and loss of genetic diversity*

The possibility for breeders to misappropriate genetic material is exemplified when UPOV is read with the Convention on Biological Diversity (CBD). Article 1 of the CBD, when read with art. 15, mandates access to genetic resources (1993). Thus, the CBD ensures that all genetic resources remain accessible (CBD, 1993). Under UPOV, such genetic resources may be construed as new despite previous cultivation until an application is made to obtain breeders' rights.

For example, plum C, a shrub found in abundance in remote parts of Africa, is used to cure the common cold. Unlike in developed nations, plants available in abundance are rarely subjects of sale in developing nations. The neem tree, which is commonly available in India, is used for its benefits. But, its sapling, seeds and leaves are never sold. Each of these possesses commonly known and used medicinal traits. Thus, plum C may be known and used in Africa for several years. It is unlikely that Africans would protect plum C due to the following factors:

(i) socio-economic factors; (ii) lack of availability of such protection; and (iii) lack of awareness of its benefits. The medicinal traits of plum C would make it very attractive to breeders and researchers in developed nations. Corporations like Shaman and Merck, for example, are regularly engaged in plants with medicinal traits. A system based on UPOV would enable a breeder accessing genetic material like plum C to treat it as a new and distinct variety, assuming that its closely related varieties have not been a subject for protection. Assuming that the plum itself is not treated as new, UPOV will enable a breeder to protect an indistinguishable derivation of plum C by making a technically distinct but non-obvious change. In essence, CBD enables unlimited access to genetic resources like plum C, while UPOV enables protection of either plum C itself or an indistinguishable variation of the plum, under specific circumstances. When working alongside the CBD, the extensive protection envisaged in UPOV can undermine a nation's genetic diversity.

### *Scope of protection*

Despite the seemingly diluted definition for determining both novelty and distinctiveness, the scope of breeders' rights, including the term, remains equivalent to that of IPRs. Breeders' rights extend by virtue of art. 14(5)(a) to the protected variety and 'varieties not clearly distinguishable' from the protected variety (UPOV, 1991). Article 14(5)(b), however, extends breeders' rights to 'essentially derived varieties', which are defined as predominantly derived either from the initial variety or from another variety that is predominantly derived from the initial variety and is clearly distinguishable from the initial variety. In essence, breeders' rights extend to clearly indistinguishable varieties and also to clearly distinguishable varieties derived from the initial variety. The breeders' rights over fruit X include rights over fruit X itself, and over clearly indistinguishable varieties or derivatives of fruit X. Assume that farmer F, using the art. 15 personal experimentation exception, derives fruit Y from fruit X, where fruit Y is clearly indistinguishable from fruit X. Then, the farmer derives another variety, pea Z, from fruit Y. Pea Z is clearly distinguishable from both fruit X and fruit Y. The breeders' rights under UPOV extend to the clearly indistinguishable varieties like fruit Y provided it is derived from fruit X. Breeders' rights also extend to varieties like pea Z that are clearly distinguishable from fruit Y and fruit X. Thus, a breeder can claim rights of other farmers' or breeders' experimented varieties even if such varieties are clearly distinguishable from the protected variety (UPOV, 1991, art. 14). Considering that plants essentially derived from genetic materials are protected as hybrids, it is ironic that plants essentially derived from the hybrids are not entitled to new protection, even if distinguishable from the initial variety, but instead fall within the scope of breeders' rights.

The lack of appropriate limitations under UPOV further broadens the scope of breeders' rights. Article 15 discusses two types of exceptions: compulsory and optional (UPOV, 1991). The compulsory exceptions include acts done for private, non-commercial and experimental purposes. Breeders can override even these limited exceptions by conditioning initial access to the protected variety on forfeiture of these rights. Article 14(5), under which varieties 'essentially derived' either from the initial variety or its first generation fall within the scope of breeders' rights, limits the scope of the experimental purposes exception (UPOV, 1991).

Thus, acts done for experimental purposes do not amount to infringement. However, if the acts done for experimental purposes on a protected variety result in another variety, the breeder gets the rights over that variety even if it is clearly distinguishable from the initial variety. The exceptions meant for private and non-commercial use have minimal benefits. Farmers generally plant protected varieties to commercially capitalize on higher yield. Considering this, farmers' benefits will be marginal from the yield if it cannot be commercialized. In the context of agricultural subsidies, the fourth section of this chapter argues that the operation of the exception becomes inconsequential to farmers.

The broad scope of breeders' rights in UPOV has resulted in a correspondingly narrow scope of farmers' rights. For example, UPOV 1978 did not embody detailed limitations on farmers' rights. UPOV 1991, however, limits farmers' rights to save seeds for replanting only within their own holdings. Furthermore, art. 15 limits the governments' ability to provide for farmers' rights. Governments can provide farmers' rights 'within reasonable limits and subject to the safeguarding of the breeder's legitimate interests' (UPOV, 1991, art. 15(2)). The art. 15 language in UPOV provides primacy to breeders' rights and derogates farmers' rights. The limited scope of art. 15 prevents governments from making concessions to farmers towards balancing welfare with trade. Such a balance is especially important for farmers in the Third World who belong to the poorer societal classes. The public interest exception detailed in art. 17 is the only limitation on breeders' rights (UPOV, 1991). It is unclear whether a welfare issue arising from the effect on farmers alone could qualify as a public interest requirement, even though a substantial portion of the population may be dependent on agriculture.

Similarly, breeders' rights under UPOV 1978 extended to 'production for commercial marketing, offering for sale, marketing; extensive protection may be agreed' (art. 5(1)). UPOV 1978 also states that '[a]uthorisation by the breeder shall not be required either for the utilisation of the variety as an initial source of variation for the purpose of creating other varieties or for the marketing of such varieties' (art. 5(3)). Correspondingly, however, UPOV 1991 extends breeders' rights to 'harvested material, produce from the harvested material, essentially derived varieties, varieties not clearly distinguishable, [and] varieties that need repeated use of the protected variety'.

Ultimately, UPOV treats farmers' rights as negotiated exemptions of breeders' rights (Pegu, 2002). The increasing scope showcases UPOV's inability to balance breeders' rights with farmers' rights. Since developing nations house more small farmers and peasants, the inefficiency from a system like UPOV that does not balance breeders' rights with farmers' rights can result in increased welfare issues, thereby impeding countries from attaining social and economic goals.

The only UPOV restriction on breeders' rights exists under the public interest exception of art. 17 (UPOV, 1991). The term 'public interest' is undefined. UPOV does not indicate what the term is and who determines when public interest is affected. Reading the terms of the Doha Declaration into public interest by virtue of TRIPS may enable countries to determine when they may invoke the exception. Even so, it is in the interest of the member states to either define or appropriately clarify constituents of the public interest exception. Critics may argue that, should the necessity to define public interest arise in the future, countries have

the right to take the issue to the WTO Panel for settlement of disputes for failure to appropriately implement art. 27.3. The necessity to resolve disputes in an international forum in an emergency is not per se a demonstration of inefficiency. At the very minimum, however, clarity on the constituents of the exception would help developing nations balance breeders' rights with other vital national interests. Moreover, leaving the definition of public interest to the predilections of a WTO Panel is bound to create dissatisfaction among member states. If a public interest emergency is at stake vis-à-vis food rights, a WTO panel may be ill-equipped to take over the sovereign responsibility of deciding whether there is in fact such an emergency. A WTO Panel may also be a grossly inadequate forum to supersede sovereign determination of public interest emergency considering that abundance is the source of problems in developed nations compared with deprivation in developing nations. The task of the WTO Panel to appreciate and understand the unique ramifications of national needs of a member state may be challenging.

Determining the limitations of breeders' rights and defining public interest is important to avoid the maladies developing nations previously faced with the pharmaceutical patent issue. With respect to the debate on pharmaceutical patents, the term 'national emergency' in art. 31 of TRIPS was left undefined. Article 31 of TRIPS provides for compulsory licensing of pharmaceutical patents 'in the case of a national emergency, or other circumstances of extreme urgency or in cases of public non-commercial use' (TRIPS, 1994). When developing nations like South Africa, Thailand and Brazil attempted to invoke the national emergency exception in art. 31 of TRIPS, debate arose regarding interpretation of the term (TRIPS, 1994). Attempts by developing nations to use the right to compulsorily license patents were met with resistance (Marc, 2001). Developed nations argued that the level of threat to public health was not necessarily a national emergency as contemplated under TRIPS (Ford, 2000; Marc, 2001). The road to the WTO to define national emergency proved to be time-consuming and expensive for developing nations. South Africa first requested a price reduction for pharmaceuticals in 1996 (Cooper *et al.*, 2001). After 5 years, in 2001, the Doha Declaration attempted to clarify the rights of the developing nations under TRIPS (Doha, 2001). Meanwhile, distinct suffering in terms of resources, human lives and national health occurred in the countries involved. Most importantly, by the time the WTO recognized the issues developing nations faced, the southern regions of Africa accounted for approximately 25 million, or approximately 70%, of the world's human immunodeficiency virus (HIV)-infected patients (IIPi, 2000). In the face of a public interest situation, the time and effort that would have to be invested to get a clarification of the exceptions from the WTO may be better used to tackle the situation at hand. In the case of the dispute with pharmaceutical patenting, the time taken to resolve the dispute itself proved to be a detriment. Resolving or clarifying definitional ambiguity in international conventions increases the economic efficiency of its functioning by saving time and other resources that would otherwise be invested. It is in the interest of developing nations to avoid a similar situation in UPOV. The pharmaceutical patents dispute exemplifies the need for term clarifications under UPOV for developing countries. Importantly, the issue with the pharmaceutical dispute highlights that developing

nations need to be aware that under a much higher standard (national emergency standard) there was substantial resistance to limitations on rights.

The difficulties the European Technical Board of Appeal, established under the EPC, faced in interpreting the 'morality' exception demonstrate the complexities that arise from introducing unclear exceptions to rights. In *Plant Genetic Systems v Greenpeace, Ltd.* (Greenpeace, 1995), the Technical Board of Appeal (hereinafter [AU5] Board) scrutinized the meaning of the morality exception to art. 53(a) of the EPC (EPC, 1975). In discussing the term morality, the Board focused its analysis on [AU6] 'conventionally accepted standards of conduct pertaining to European culture' (Greenpeace, 1995). There are, however, no conventionally accepted European standards of conduct. Although EPC's ruling on the meaning of morality has little relevance to interpretation of the term 'public interest' in UPOV, it demonstrates the ambiguities that can arise from introducing unclear exceptions. The subjectivity will almost always be detrimental to the interests of developing countries because they are more likely to use the public interest exception. With UPOV, if developing nations use the exception under art. 17 to limit breeders' rights in public interest, a disagreement similar to the pharmaceutical patent dispute may arise with respect to the definition of public interest. There is no guarantee that the developed and the developing nations will necessarily have consensus on what amounts to 'public interest.'

## Introducing Plant Breeders' Rights Will Not Reduce Trade Barriers in Agriculture

This section argues that even if PBRs fulfil promised expectations, they can neither benefit the developing nations nor reduce distortions in international trade in goods as long as agricultural subsidies foreclose the markets for the developing country produce. Instead, the prevalence of subsidies will result in subjecting farmers to additional costs without any benefits. The reduction of subsidies, which create the maximum international trade barriers in agriculture, should precede the introduction of PVP in order for developing nations to derive any benefit from PBRs. Developing nations should therefore seek an extension of the transitional period for compliance with the PVP requirement under art. 27.3 until the resolution of the agricultural subsidies issue. Otherwise, the introduction of PBRs will upset the status quo in developing nations.

### Trade barriers in agriculture

In discussing PBRs, the WTO Review of art. 27.3 of TRIPS specifies that PVP is required to further the general objective of TRIPS, which is reduction of international trade barriers in agricultural commodities (Council for TRIPS, 2002). Particularly, UPOV endorses the TRIPS view that PVP will positively affect international trade barriers in agriculture. However, any benefit from introducing PBRs will operate alongside other policies that impact agriculture. The biggest impact on agricultural commodities is felt from trade barriers. Trade barriers

refer to impediments to international trade from extraneous factors. In agriculture, trade barriers refer to impediments affecting the agricultural commodities market. Trade barriers artificially limit demand in a country and thus decrease potential sales in that country by another country, or artificially limit the ability of one country to sell in its own or another country. Two important barriers that impact international trade in agricultural commodities are: (i) government restrictions; and (ii) lack of PVP.

### *Barriers from agricultural subsidies*

Government restrictions on international trade are imposed as taxes, duties or subsidies. Subsidies form the most important barrier to international trade in agriculture. They fall within the ambit of art. 1 of the WTO Agreement on Subsidies and Countervailing Measures (ASCM) (1994). Subsidies refer to the financial support governments provide to offset or balance the losses farmers or traders suffer, or are likely to suffer in agricultural commodities. Generally, there are several forms of government financial contributions. Governments may support the income of the farmers. For example, the Government of Timbatu may agree to subsidize rice farmers up to a minimum income of US\$5000/year from the sale of rice. The government subsidy compensates the difference between expected income of US\$5000 and the actual income earned by the farmer. Therefore, a farmer earning US\$1000 will be eligible for a subsidy of US\$4000 from the government.

Alternately, government subsidies may support shortfalls in commodity prices. For example, the Timbatu Government's subsidy may compensate rice farmers up to US\$5 per unit. The subsidy compensates the difference between the actual sale price per unit and the expected sale price of US\$5. If the farmer sells rice at US\$1 per unit, the government will compensate the farmer with US\$4 for each unit sold. In the same note, the government may also pay the farmer US\$5 for each unit of unsold rice. In practice, the subsidies' cushioning effect serves as an incentive for farmers to sell below the general market price.

Governments may also specifically limit subsidies to designated geographic regions. Such subsidies need to be 'specific' under art. 2.2 of the Agreement on Subsidies (1994). Some governments provide subsidies in the form of fiscal incentives like tax credits or as goods or services other than general infrastructure. All forms of subsidies ensure a certain percentage of profit or income to the farmers. Subsidies largely eliminate the risks associated with the marketability of the commodity.

The Agreement on Subsidies addresses two main types. Subsidies contingent upon either export performance or use of domestic over imported goods are prohibited because they are specifically designed to distort international trade, and are therefore likely to hurt other countries' trade (Agreement on Subsidies, 1994, art. 3). Subsidies with potential to injure or seriously prejudice the domestic industry of another member or affect the benefits accruing to other members are actionable (Agreement on Subsidies, 1994, art. 2). In order for action to be taken, the affected country must prove that the subsidy has adversely affected its interests (Agreement on Subsidies, 1994, art. 5). However, under art. 13 of the AOA, members agreed not to take action against subsidies maintained on agricultural products for a period of 9 years beginning in 1995.

Some actionable and all prohibited subsidies cause the following injuries to international markets. First, subsidies of an exporting country harm the domestic industry of an importing country (The Developmental Impact, 2002). Suppose the country of Timbatu compensates its wheat exporters up to US\$5 per unit of wheat sold. Timbatu exports wheat to Utopia, where, owing to the cost of production, farmers sell wheat at US\$6 per unit. Timbatu's farmers can price the wheat anywhere between US\$1 and US\$5 and still compete with Utopia's market because the government compensates up to US\$5. Hence, consumers in Utopia would prefer the imported wheat available at lower cost. Timbatu's artificially lowered prices thereby affect the sales of Utopia's farmers.

Second, subsidies affect the ability of rival exporters from non-subsidizing countries to compete with other markets (The Developmental Impact, 2002). Assume that the international price of rice is US\$15 per unit, and that Timbatu's subsidies compensate rice farmers for losses up to US\$10 per unit sold. Timbatu's farmers can export rice at the lowest artificial price of US\$5 per unit. In turn, the Timbatu Government compensates its farmers with subsidies. The lowered cost of Timbatu rice will affect both the national and international markets of farmers from countries other than Timbatu. The subsidies will affect farmers from countries intending to export to a country that imports from Timbatu. Therefore, Pragnolia, another rice exporter, will be unable to compete fairly to export to Utopia, a rice importer. Pragnolia farmers' commodities, even if fairly priced, will be expensive in Utopia as well as in the international market. Hence, Pragnolia's farmers can compete with Timbatu's farmers only if the formers' government matches or beats the Timbatu subsidies. Thus, Timbatu subsidies effectively eliminate or insulate Timbatu farmers from market risks. They prevent farmers in other nations from fairly accessing the market without sustaining a loss until their own nations are able to match the artificially lowered prices. Farmers from Timbatu, in turn, benefit from the sales in the international market and are compensated by their taxpayers.

By eliminating or insulating farmers from risks of the international market, subsidies encourage overproduction of agricultural goods. Agricultural trade in the international market suffers due to overproduction of commodities by nations providing subsidies. If Timbatu subsidizes income or price of rice exports, farmers tend to produce rice for international markets. Excess availability of rice decreases the demand for rice in the international market and drives down the prices. Thus, overproduction results in a decline of global rice prices (The Developmental Impact, 2002). In order to remain competitive in the international market, farmers from Timbatu must further reduce the price for the commodity (rice) and, in turn, seek the export subsidies. Thus, export subsidies promote a vicious cycle. Slowly, such reduction may result in the export price of Timbatu rice being lower than the price of rice in the national market. When export price of a product is below the selling price of the commodity in the national market, dumping results (Agreement on Subsidies, 1994). Generally, dumping occurs when the export price of a commodity sold is less than the cost of production in the country of origin plus a reasonable addition in the selling cost and profit (Wealthy Countries' Trade Policies, 2003).

Export subsidies inevitably lead to dumping, resulting in unfair competition created from artificially lowered prices, thus distorting domestic and world

prices of commodities. Dumping results in lowering the commodity prices and directly affects non-subsidizing nations or countries unable to match the subsidies. Generally, export subsidies affect nations that depend on agriculture but are unable to match the richer nation subsidies. When Timbatu farmers sell their commodities at a lower price in the international market, other countries procure these commodities for their local use at lower cost. Thus, Timbatu farmers dump their excess rice on other countries, which affects the marketability of their native rice. Less-expensive foreign rice floods the markets of rice importers like Utopia because it is cheaper than the domestic rice. Dumping affects the livelihood of farmers who comprise a sizeable section of the population in essentially agrarian countries and, in turn, affects the economy. Although consumers may benefit from the lower rice prices, the economies of countries dependent on agriculture suffer due to the inability of farmers to make the expected returns. Thus, dumping resulting from the subsidies creates an important international trade barrier in agriculture.

#### *Barriers from lack of plant variety protection*

Lack of PVP also imposes the greatest barrier to agricultural trade. The trade distortions from lack of PBRs occur when farmers infringe upon protected varieties, replant protected seeds or practise brown-bagging for future commercial replantation. Lack of PVP results in an economic cost to the breeder and to the developed world where such rights are prevalent. Since developed nations protect plant varieties, issues arising from the lack of PBRs typically do not affect developing nations. Monsanto's experience in Argentina with Roundup Ready soybean exemplifies developed nations' concerns in this area. Roundup Ready soybean comprises more than 95% of the Argentine soybean crop (Innovest Group, 2005, p. 9). Monsanto, however, closed operations in Argentina in 2004 due to lack of revenue generated as a result of inadequate plant varieties protections (Innovest Group, 2005, p. 9). Few studies focus on distortions from lack of PVP per se, although the Monsanto experience causes alarm in developed countries.

While the impact of trade barriers from such flagrancies may seem catastrophic, the overall impact is miniscule when compared with the impact from subsidies. In 1997, for example, the US Department of Agriculture (USDA)/ Economic Research Service (ERS) and Foreign Agricultural Service (FAS) estimated the cost of foreign trade barriers to US agricultural exports at US\$5.8 billion annually (Becker, 1997). The projected sum included the impact on US agricultural exports from both agricultural subsidies in other nations and from lack of PVP (Becker, 1997). Generally, the cost from developing nations misusing protected varieties owing to the lack of PBRs has been minimal due to two reasons: (i) subsidies determine whether exports will occur; hence, unauthorized protected varieties do not enter the international market; and (ii) private market players do not operate in countries without PVP. Even in the few developing nations where such companies are established, their presence tends to be limited. The preceding argument, however, discounts the international market for lost exports to such non-PBRs national markets. The non-PBRs nations artificially prevent the demand in their markets from being reflected in the international market, resulting in international trade distortions. Rectifying these distortions

translates as benefits from increased competition, driving down the prices of essential commodities. Despite this, as long as export markets remain closed to subsidies, the farmers in developing nations will be unable to exploit the fullest potential of the local or international market. Hence, the benefits to developing nations from introducing PBRs will be minimal as long as the subsidies foreclose the market for their products. Thus, in reality, rectifying the distortions has limited global benefit. The opening of the market, however, will significantly benefit developed nations. First, most benefits of establishing PBRs regimes will accrue to the developed rather than the developing nations. Second, lack of PBRs has minimal effect on international trade (especially when compared with the effect of subsidies discussed later).

Subsidies of developed nations, on the other hand, create far greater barriers in agricultural trade for developing nations. Developed nations including the USA spend an estimated US\$300 billion/year in subsidies (The Developmental Impact, 2002). Developed nations subsidies affect US\$40 billion worth of net agricultural exports per year from developing countries (The Developmental Impact, 2002; Martinez, 2003). In 1997, the loss to developing countries from agricultural subsidies of the developed nations accounted to US\$24 billion (IFPRI, 2003). Annually, Latin America and the Caribbean alone lose US\$8.3 billion from the loss of agricultural trade (Wealthy Countries' Trade Policies, 2003). This loss is estimated at US\$6.6 billion/year for Asia and US\$2 billion/year for sub-Saharan Africa (Wealthy Countries' Trade Policies, 2003).

The effect of subsidies on the agricultural trade of developing countries affects international trade in agricultural commodities. The total amount of agricultural subsidies in developed countries, at US\$300 billion/year, represents approximately twice the global wealth of all developing countries or six times the current annual level of total overseas development assistance that developed nations provide to poor countries (The Developmental Impact, 2002). Elimination of the subsidies of developed nations would triple net agricultural trade in developing countries. The estimated gains to all countries (both developing and developed) from the elimination of subsidies and tariffs in developed countries are approximately US\$100 billion (Rich Nations Need, 2003). Thus, developed nations subsidies create the maximum barriers to international trade in agriculture. Subsidy barriers of richer nations far exceed those that the lack of PBRs (and prevalence of subsidies) in developing nations generate. The decrease of global trade barriers by reducing or eliminating developed nations' subsidies will indirectly improve the economies of developing nations.

### **Plant breeders' rights and international trade barriers**

The following sections discuss how subsidies determine whether exports will occur and establish that developing nations cannot benefit from PBRs as long as trade barriers from subsidies remain unaltered. Otherwise, introducing PBRs may adversely affect the status quo by deteriorating the economic conditions of countries dependent on farming by imposing additional costs on the farmers.

### *Effect of international and local market*

The coexistence of PVP with trade-distorting agricultural subsidies will adversely affect the market for farmers in developing nations. The market will likely remain artificially foreclosed for varieties that richer nations subsidize, thus preventing developing nations from reaping adequate economic benefits even if PBRs result in promised benefits like high-yielding or pest-resistant hybrids. If, for example, farmer A in Magnolia, a developing country, improves his yield by 40% by using hybrid rice, his or her benefit from the extra yield accrues only if the yield is sold either in domestic or international markets. In international markets, however, subsidies result in farmers from developed nations dumping commodities below the cost of production. The dumping directly affects the sale of farmer A's produce. Thus, his or her sales from the export market will be affected as long as the subsidies of Magnolia remain lower than the subsidies of developed nations. Thus, the introduction of PVP will not fully benefit farmers in nations that cannot match the subsidies of richer countries. However, the economic conditions of developing nations prevent them from matching the subsidies of developed nations. Moreover, nations borrowing from institutions like the World Bank and other international donors, typically developing nations, are encouraged to eliminate subsidies (The Developmental Impact, 2002). International institutions, however, exercise minimal influence in developed nations to enforce corresponding measures. For example, India has reduced its subsidies to an annual sum of US\$1 billion for its 110 million landholders, equivalent to only US\$9 (£6)/year/farm (The Developmental Impact, 2002). Conversely, every wheat farmer in the EU currently receives a subsidy of approximately US\$53 (£35)/t (The Developmental Impact, 2002).

In the above-mentioned example, farmer A must recoup the cost of production from the local market since the export market is closed on account of trade barriers from subsidies. However, farmers from the richer subsidizing markets cannot dump their goods in the export market unless they beat the prices of farmers from non-subsidizing markets. The sale price of the dumped goods is generally lesser than the fair price of local goods after taking into account the cost of production. Goods thus dumped at lower prices in international markets are generally procured for national markets. Competition from the dumped commodities adversely affects the sale of farmer A's produce in the local market. Even if farmer A sells at the cost of production, he or she will be unable to compete with the dumped goods. Consequently, despite the higher yield, farmer A may be unable to sell the yield in either local or international markets. Thus, the artificially deflated prices resulting from developed nations' subsidies prohibit farmers in developing nations from reaping the benefits of the higher yield. Furthermore, in a market artificially deflated by subsidies, but open to PBRs, private sector players should be expected to import commodities at lower cost from other subsidizing countries (Butler and Marion, 1985). Food importation further aggravates the gap between the rich and the poor by elevating poverty levels of farmers in poorer nations. Until the imbalances from agricultural subsidies are removed, the status quo of the marketability of the produce of developing nations will remain unaltered. Hence, the presence and influence of subsidies limit the ability of PVP to contribute meaningfully towards improving the status quo.

PBRs proponents underplay the interaction between subsidies and PVP and the fact that subsidies drive export markets. Instead, PBRs supporters argue that at the very minimum, farmers in developing nations can benefit from a higher yield. These arguments do not take into account that the higher yield becomes inconsequential for farmers if they cannot sell the produce to either reap the cost of production or earn a profit. As long as the markets remain artificially deflated, the farmer will be unable to translate the higher yield into financial benefits. Others argue that farmers can use the higher yield for individual use, which is an exemption under art. 15 of UPOV. There is, however, only so much of the yield that a farmer can use for individual purposes. Moreover, increased yield in one commodity by itself does not offset the farmers' need for finance to procure other (agricultural) products. For example, if a farmer from a developing country benefits from a higher yield of rice, that still does not discount the need for monetary return for the farmer to purchase other necessary commodities or provisions. Furthermore, farmers using their yield for individual purposes will limit economic activity within developing economies. Farmers forced to use the higher yield for individual purposes, due to lack of market, defeat the whole objective of introducing PBRs as an incentive to develop new, 'socially' beneficial varieties. Thus, if farmers are unable to sell their produce, developing economies dependent on agricultural trade will not benefit from PBRs.

#### *Additional cost from PBRs*

Notwithstanding the inability to benefit, developing economies may in fact suffer a detriment from PBRs, owing to the additional costs that become applicable. Farmers in a PBR regime, where subsidies foreclose the markets, will face two new additional costs. Considering the previous example, if the rice is unsold, farmer A in Magnolia would be left with two costs that were of no concern previously: (i) the cost of storage; and (ii) the cost of acquiring seeds for replanting.

PBRs generally prevent farmers from saving seeds for replanting, even in their own holdings. Although exceptions granting farmers the right to replant their own seeds is optional under UPOV, breeders will generally prohibit replanting use as part of the contract with the seed buyers (1991, art. 15(2)). The optional provision (UPOV, 1991, art. 15(2)) allows farmers to replant saved seeds to use for propagating purposes. The inbuilt safeguards of the optional provision, however, limit farmers' ability to replant saved seeds for commercial use. Hence, lack of expected return or inadequate return from the market may force farmers to seek outside means to finance replanting. If farmers benefit from the markets in the future, financing from debt institutions works well. But as long as the subsidies prevail, it is unlikely that farmers will profit. Despite the higher yield, the long-term effect of subsidies may actually increase household debts and thus worsen the livelihood of farmers over a period of time, thereby affecting economies dependent on agriculture.

Another disadvantage to farmers is the increase in seed prices. Economic studies, like the Butler and Marion report, for example, point to increases in seed prices as one of the effects of introducing PBRs (1985). The increase in seed prices is generally an inconsequential effect of PBRs if the promised return from higher yield is fulfilled. Increased seed prices, however, work as an additional burden for

farmers from countries that developed nations' subsidies affect because the market for the farmers' yield is artificially deflated.

Aggressive private sector behaviour following PBRs' introduction may cause further suffering for developing nation farmers (Butler and Marion, 1985). The Butler and Marion report suggests that PBRs' introduction results in aggressive private sector behaviour. This causes an increased flow of scientific information, including germplasm, from the public to the private sector (1985). The aggressive behaviour may also translate into attempts to protect varieties of germplasm that are yet undocumented or not a subject of PBRs using the loopholes in UPOV. As discussed in the first section, such aggressive private sector behaviour may be detrimental to genetic diversity at all times. Furthermore, subsidies foreclose farmers' opportunities in local and international markets.

### Working PBRs alongside agricultural subsidies

Introducing PBRs before curtailing agricultural subsidies can contribute to, if not create, losses without any offsetting benefits. Introducing PVP will not affect international trade in agriculture positively so long as agricultural subsidies limit access to the markets. Developing nations' ability to benefit from PBRs depends on interaction with other market mechanisms. In order for nations to benefit from PBRs, the impediments from agricultural subsidies must be removed. Hence, developing nations should resist adopting the TRIPS art. 27.3 requirement of establishing a PVP regime until the AOA and the ASCM are implemented to reduce or eliminate the trade-distorting subsidies of developed nations.

Two things are prominent in this context. First, the transition period for adopting the art. 27.3 requirements expired in 2005. Similarly, art. 13 of the AOA (AOA, 1994), detailing the subsidy reduction commitments applicable to developed nations and termed 'peace clause', expired at the end of 2003. Developing nations should highlight that the objective of introducing PBRs cannot be achieved until the AOA and the ASCM are implemented to reduce or eliminate the trade-distorting subsidies of developed nations. Hence, as a precondition to adopting PBRs, developing countries should rightfully demand that developed nations fulfil their commitments. Developing nations should highlight the legal vulnerabilities of the subsidy programme, either in the next round of WTO talks at Geneva or, alternatively, take the dispute to the WTO Panel. Considering the transactional cost of the latter option (Steinberg and Josling, 2003), developing nations may seek a clarification on the PBRs' requirement of art. 27.3 of TRIPS similar to the clarification on public health. If developed nations want their protected commodities to be introduced into the worldwide market, subsidies should be eliminated. Developed nations cannot have the option of both subsidizing and exporting their commodities at premium price.

Similarly, developing countries should consider adopting a differential monopoly term depending on the economic development of the nation. In countries like Ethiopia, where access to food remains a major problem, monopolizing food rights for 20 years deprives nations of the very benefits that PBRs are intended to create. Alternatively, countries wishing to adopt UPOV or a similar regime should retain

the right to compulsorily license PBRs in public interest or in national emergencies to enable access to food. Countries that fear the consequential parallel importation of food should seek appropriate undertakings from respective governments to avoid such importation.

## Conclusion

The UPOV Position Based on an Intervention in the Council for TRIPS (UPOV Position, 2000) details that:

[I]nternational harmonization in the protection of new varieties of plants is essential. The introduction of a system which differs significantly from the harmonized approach based on the UPOV Convention will raise questions with regard to the implementation of the TRIPS Agreement. . . . Should a country introduce a system not compatible with the internationally harmonized system based on the UPOV Convention, this might result in barriers to trade and the transfer of technology.

(UPOV Position, 2000)

The Position Statement indicates that TRIPS harmonizes PVP by designating UPOV, under art. 27.3, as the mandatory *sui generis* system and argues that harmonization of PVP is essential to reduce trade barriers and increase transfer of technology (UPOV Position, 2000). The above-mentioned sections establish that UPOV is neither the mandatory nor the minimum standards for a *sui generis* system. Similarly, the Position Statement premise that unless members adopt UPOV as the *sui generis* system, technology transfer would suffer and international trade barriers would remain distorted lacks a proper basis. A PBRs regime not based on UPOV would not result in trade barriers, or even if it did, such barriers would not be inconsistent with TRIPS (particularly given the *sui generis* authority in TRIPS art. 27.3). The premise that PVP, harmonized or otherwise, can contribute to reduction of international trade barriers in agriculture itself is questionable. Because of the agricultural subsidies, PVP regimes have limited ability to reduce trade barriers.

Developing nations need to prioritize their national goals with a clear understanding of the benefits and detriments before creating a PBRs regime. Unlike the case of pharmaceutical patents, developing countries overcame pressures from the developed nations to push 'an expansive agenda' in the Cancun negotiations (Panagariya, 2003). The WTO meeting at Cancun established a common ground for developing nations to seek international policies conducive to their development (Panagariya, 2003). The Cancun meeting also signified a distinct change in bargaining power between the developed and the developing nations. By capitalizing on this leverage, developing nations should seek further negotiations to maximize the benefits they derive from introducing PVP.

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## Notes

- 1 The term refers to multilateral negotiations launched in Uruguay, which, in 1994 established the WTO to administer the set of negotiated agreements.
- 2 Agreement on Trade-Related Aspects of IPRs, 15 April 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex I.C., Legal Instruments – Results of the Uruguay Round, Vol. 31, 33 I.L.M. 81 (1994) (hereinafter TRIPS).

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#### Author Queries:

- [AU1] Ulrich et al. (1986) is not included in the list.
- [AU2] Please clarify whether 'effective' in the heading have been deleted is correct.
- [AU3] Please provide reference for the citations "Strasbourg Convention, 1963" and "Cooper et al., 2001" given in text.
- [AU4] Long and D'Amato, 2000 is not included in the Ref. list.
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- [AU8] Pls update Grain, 1999.
- [AU9] Please provide page nos. for the reference "Panagariya, A. (2003, 16 September)"
- [AU10] Pls update Pegu, 2002.
- [AU11] Pls provide article title.