

2 LINKING INTELLECTUAL PROPERTY RIGHTS WITH PLANT GENETIC RESOURCES: MYTHS AND REALITIES FOR FOOD SECURITY IN LEAST DEVELOPED COUNTRIES SUCH AS BANGLADESH

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ABSTRACT

The TRIPS Agreement establishes standards for national protection of intellectual property rights (IPRs) that touch on plant genetic resources (PGRs), especially in the form of plant varieties and biotechnology, specifically through patents and plant varieties protection (PVP). This maintains a one-size-fits-all approach for all countries irrespective of their standing in terms of their relative economic development and their basic needs such as food security. This paper revisits the relationship between the TRIPS Agreement and PGRs, including major myths and realities relating to food security in least developed countries, particularly Bangladesh. Furthermore, it examines the issue of IPR regimes with the most relevance to PGRs. It then focuses on the existing laws in Bangladesh relevant to PGRs, including the draft plant variety protection laws that Bangladesh must undertake to secure compliance with the TRIPS Agreement. The paper also summarizes the progress to date in establishing IPRs in PGRs in Bangladesh. Based on these observations, it provides recommendations for the design and operation of an intellectual property system tailored to Bangladesh's PGRs and food security concerns.

Keywords: intellectual property rights, TRIPS Agreement, Bangladesh, least developed countries, plant genetic resources, plant varieties protection, agriculture, sui generis protection

I. INTRODUCTION

The World Trade Organization (WTO) Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS Agreement)¹ establishes standards for national protection of

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¹ Agreement on Trade-Related Aspects of Intellectual Property Rights, 15 April 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1C, 33 ILM 1197 [hereinafter TRIPS Agreement or TRIPS].

IPRs² that touch on PGRs, especially in the form of plant varieties and biotechnology, specifically through patents and PVP. This maintains a one-size-fits-all approach for all countries irrespective of their relative economic development and basic needs such as food security. Developed countries have gradually developed technology to genetically modify PGRs. Such technology often produces better yields and ensures food security. Moreover, licensing fees from the trade of PGR-based products also encourage further research and development (R&D) aimed at enhancing PGRs. This signifies that the IPR protection of PGRs will lead to more appropriable yields ensuring enhanced food security.

However, least developed countries such as Bangladesh lag behind research and development (R&D) and often cannot afford to import technology for the genetic modification of PGRs. Rather, farmers in Bangladesh are accustomed to the free availability of PGRs. Free availability enables farmers to produce crops at low costs and thus helps meet their food security requirements. Moreover, by using genetic technology in their small holdings, least developed countries such as Bangladesh produce better yields, further enabling them to meet their food security requirements. However, licensing fees for using patented technology usually increase the costs of food production, which in turn jeopardizes food security.

The entry into force of the TRIPS Agreement linked two previously less related domains, namely intellectual property and international trade. Thus PGRs became commodities of trade, since under the TRIPS Agreement, WTO Members are obliged to protect microorganisms, microbiological processes and non-biological processes for the production of plants and animals, and plant varieties, through IPRs, including patents or *sui generis* (of its own kind) protection. Accordingly, countries are also banned from using goods embodying IPRs without paying licensing fees. Such obligations restrict access to PGRs, which were once free for all. Restricted access to PGRs is compounded by the fact that the TRIPS Agreement is not primarily an agreement about food and agriculture and hence it does not refer to any notion of food security.

Pursuant to the TRIPS Agreement obligations, Bangladesh prepared its draft Patent Law 2007, which paved the way for patenting PGRs. In addition, under bilateral investment treaties, namely, the United States-Bangladesh Bilateral Investment Treaty 1986 and the European Union-Bangladesh Cooperation Agreement on Partnership and Development 1999, Bangladesh is required to enter into consultation and negotiations to join the International Convention for the Protection of New Varieties of Plants (known as UPOV after its French acronym), which contains standards on *sui generis* protection.³ Accordingly, Bangladesh is in the process of preparing a draft Plant Variety and Farmers' Rights Protection Act (draft Plant Variety Act) containing a UPOV-style *sui generis* protection system, a system (as an alternative to patent

² It was customary to refer to industrial and intellectual property rights. The term 'industrial' was used to cover technology-based subject areas such as patents, designs and trademarks. 'Intellectual property' was used to refer to copyright. The modern convention is to use 'intellectual property' to refer to both industrial and intellectual property. The TRIPS Agreement translates IPRs into trade-related intellectual property rights in order to commercialize the inventions and simultaneously prevents others from doing so, unless licensing fees are paid; for further details, see M Rafiqul Islam, *International Trade Law of the WTO* (2006) 379–380.

³ The International Convention for the Protection of New Varieties of Plants was adopted on 2 December 1961, by a Diplomatic Conference held in Paris. It was revised in 1978 and 1991 [hereinafter UPOV Convention].

protection) also required in the TRIPS Agreement. In addition, as a party⁴ to the Convention on Biological Diversity⁵ and the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA)⁶, with the support of local and international entrepreneurs, Bangladesh drafted the Biodiversity and Community Knowledge Protection Act (draft Biodiversity Act) containing access to and benefit sharing of PGRs.⁷

However, the UPOV-based draft laws have sparked extensive debate in Bangladesh between policymakers and civil society. Central to these discussions is the issue of striking a balance between the rights of commercial breeders and the traditional rights of farmers and communities to save, use, sow, resow, exchange and sell seeds. In fact, striking the right balance between the rights of breeders and farmers can ultimately lead to the establishment of a regime that may enhance food production in a densely populated country at a low cost, and help meet Bangladesh's food security objectives.

This paper revisits the relationship between the TRIPS Agreement and PGRs and its major implications and challenges relating to food security for least developed countries, particularly Bangladesh, and also examines the issue of IPR regimes with the most relevance to PGRs. It then focuses on existing laws in Bangladesh relevant to PGRs, and the draft laws proposing plant variety protection that Bangladesh needs to undertake as part of securing compliance with the TRIPS Agreement. This paper summarizes the progress to date in establishing IPRs in PGRs in Bangladesh. Based on these observations, this paper offers recommendations for the design and operation of an intellectual property system tailored to PGRs and Bangladesh's food security concerns.

II. THE RELATIONSHIP BETWEEN INTELLECTUAL PROPERTY RIGHTS IN PLANT GENETIC RESOURCES AND FOOD SECURITY

Innovations in PGRs, including seeds, plants and plant parts, often involve plant breeding and agro-biotechnology products. Such innovations are not made in isolation, but are derived from existing PGRs that are often freely available in the public domain and protected by IPRs.⁸ This protection of IPRs in PGR-cum-public goods gives rise to significant controversy over food security between plant breeding industries and farmers based in developing and least developed countries.

⁴ Bangladesh signed and ratified the Convention on Biological Diversity in 1992 and 1995 respectively. Bangladesh's International Treaty on Plant Genetic Resources for Food and Agriculture signed on 17 October 2002 and ratified on 14 November 2003.

⁵ Convention on Biological Diversity, done at Rio de Janeiro, 5 June 1992 (entered into force on 29 December 1993) 31 ILM 822 [hereinafter CBD].

⁶ International Treaty on Plant Genetic Resources for Food and Agriculture, adopted by the Food and Agriculture Organization (FAO) Conference on 3 November 2001 (entered into force on 29 June 2004) <<http://www.fao.org/ag/cgrfa/IU.htm#documents>> 23 March 2010 [hereinafter ITPGRFA].

⁷ Several drafts on Plant Variety and Farmers' Rights Protection Act were made in 2001, 2002, 2003, 2007, and 2009 [hereinafter draft Plant Variety Act]. In addition, two drafts on Biodiversity and Community Knowledge Protection Act were made in the names of Biodiversity Act and Biodiversity and Community Knowledge Protection Act [hereinafter draft Biodiversity Act].

⁸ Rahul Goel, 'Protection and Conservation - TRIPS and CBD: A Way Forward' (2008) 3(5) JIPLP 334.

Intellectual property rights in PGRs, as provided for in the TRIPS Agreement, are supported by plant-breeding industries with the view that the protection of plant genetic inventions provides incentives for plant breeding and boosts production of agricultural products that improve food security.⁹ In reality, this view can be rebutted with the contention that the conferral of IPRs in genetic innovations essentially results in a monopoly of genetic resources found in the public domain and provides unilateral benefits for a limited number of biotechnology-rich developed countries. This leads to increases in the price of agricultural products and undermines food security.¹⁰ Furthermore, although farmers based in developing and least developed countries possess unique local knowledge about their food needs and technical capacity for follow-on innovations, the breeder-cum-sellers benefiting from the innovation system often ignore farmers based in developing and least developing countries.¹¹

Moreover, because of the protection mandated in the TRIPS Agreement, multinational companies make use of herbicide-tolerant, insect-resistant and genetic restriction technologies¹², which are found to affect the traditional saving of seeds, conservation of agricultural biodiversity and other agrarian means of living in developing and least developed countries. This impinges on farmers' comparative advantage of using and reusing PGRs and thus creates challenges in addressing food security concerns.¹³ In addition, multinational companies focus only on the handful of crops with high appropriable value, including maize, cotton, soybeans and canola. Such a selective production of crops often fails to achieve food security for three-fourths of the world's population dependent on cereal crops such as rice and wheat.¹⁴

Further, IPRs in PGRs are based on the view that any increase in cereal yields achieved from an IPR-initiated reward is crucial for meeting food security. In addition, proponents of IPRs in PGRs claim that the higher yields produced from genetically modified PGRs appear to be a welcome initiative in achieving food security in South Asia and sub-Saharan Africa due to the limited amount of cultivatable land in those countries. To meet this demand for food security, growing crops using biotechnology is a reality, as is the acceptance of breeders' dominance. This acceptance signifies that compliance with the TRIPS Agreement endorses PVP and IPR rules in the form of patents and *sui generis* protection, boosts agricultural products and improves food security.

As a *sui generis* form of PGR protection and also as an exception to patents, plant breeders' rights are recognized in Europe and are provided for under the UPOV Convention. However, the TRIPS Agreement makes no reference to PBRs. In addition, the UPOV Convention provides for farmers' privileges as exceptions to patent rights. Developing and least

⁹ Anitha Ramanna, 'Intellectual Property Rights in South Asia: Opportunities and Constraints for Technology Transfer' in Suresh Chandra Babu and Asok Gulati (eds), *Economic Reforms and Food Security: The Impact of Trade and Technology in South Asia* (2005) 187–209.

¹⁰ Sarah Wright, 'Globalizing Governance: The Case of Intellectual Property Rights in the Philippines' (2008) 27 *Political Geography* 721, 722.

¹¹ Keith Aoki, 'Free Seeds, Not Free Beer: Participatory Plant Breeding, Open Source Seeds, and Acknowledging User Innovation in Agriculture' (2009) 77 *Fordham L R* 2275.

¹² B Wright, 'Agricultural Innovation after the Diffusion of Intellectual Property Protection' in Jay P Kesan (ed), *Agricultural Biotechnology and Intellectual Property: Seeds of Change* (2007) 13.

¹³ Jagjit Kaur Plahe, 'The Implications of India's Amended Patent Regime: Stripping away Food Security and Farmers' Rights?' (2009) 30(6) *Third World Quarterly* 1197.

¹⁴ B Wright, 'Agricultural Innovation after the Diffusion of Intellectual Property Protection' in Jay P Kesan (ed), *Agricultural Biotechnology and Intellectual Property: Seeds of Change* (2007) 13.

developed countries accept the UPOV exception concerning farmers' privileges in the name of farmers' rights. However, farmers' rights that counter PBRs require not only protection of traditional agrarian practices, but also recognition of farmers as breeders.¹⁵ The provision concerning farmers' rights creates an opportunity for developing and least developed countries to establish a unique system that meets both requirements.¹⁶ Such a provision enhances IPRs, as required by the TRIPS Agreement, while protecting genetic resources to promote innovation in PGRs in line with the UPOV Convention. This boosts agricultural products and enhances food security.¹⁷

In addition, this provision encourages developing and least developed countries to uphold the rights of farmers in line with the Convention on Biological Diversity¹⁸, the ITPGRFA¹⁹ and other non-binding obligations, including the International Undertaking on Plant Genetic Resources for Food and Agriculture (IUPGRFA)²⁰ that recognizes farmers' unique local knowledge of their food security and technical capacity to make follow-on innovations that meet those needs.²¹ Such efforts are likely to extend the concept of PBRs to include not only new varieties developed by breeders, particularly multinational companies, but also those developed by farmers or non-governmental organizations (NGOs).²² Furthermore, such efforts ensure that biopiracy (utilization of resources in developing countries by developed countries for profit without compensation) does not occur.²³

In Bangladesh, intellectual property laws, dating from the colonial period or remaining in effect after decolonization on the basis of the defunct rule of continuity, made no specific reference to PGRs and food security.²⁴ However, it is accepted that IPRs in PGRs came to Bangladesh with the British accession to the Paris Convention for the Protection of Industrial Property 1883 (Paris Convention).²⁵ Intellectual property rights in PGRs became applicable through the Patents and Designs Act, 1911 (Patents and Designs Act)²⁶ and the Trade Marks

¹⁵ Anitha Ramanna and Melinda Smale, 'Rights and Access to Plant Genetic Resources under India's New Law' (2004) 22(4) Development Policy Review 423.

¹⁶ *ibid* 424.

¹⁷ UPOV Convention.

¹⁸ CBD.

¹⁹ ITPGRFA.

²⁰ Report of the Conference of FAO, Rome, 22d Session, UN Doc. (1983) C/83/REP.

²¹ Susan K Sell, 'Corporations, Seeds, and Intellectual Property Rights Governance' in Jennifer Clapp and Doris Fuchs (eds), *Corporate Power in Global Agrifood Governance* (2009) 187–215.

²² Ronald J Herring and Milind Kandlikar, 'Illicit Seeds: Intellectual Property and the Underground Proliferation of Agricultural Biotechnologies' in Sebastian Haunss and Kenneth C Shadlen (eds), *Politics of Intellectual Property: Contestation over the Ownership, Use, and Control of Knowledge and Information* (2009) 66–68.

²³ Ramanna 187-89 (n 9).

²⁴ Sam Ricketson, *The Berne Convention for the Protection of Literary and Artistic Works* (1987) 797–807.

²⁵ *Paris Convention for the Protection of Industrial Property 1883*, signed 20 March 1883, 828 UNTS 305 [hereinafter Paris Convention].

²⁶ *Patents and Designs Act, 1911* (ACT NO. II of 1911) *Bengal Code Vol. VII; Pakistan Code Vol. 6*, enacted 1 March 1911 (hereinafter Patents and Designs Act).

Act, 1940, which was replaced by the Trade Marks Act, 2009 (Trade Marks Act).²⁷ However, Bangladesh did not frequently encounter private rights relating to IPRs in PGRs. This is because most of the research into PGRs was carried out by the public sector, which did not bother to obtain IPRs in PGRs. In addition, previously IPRs were not concentrated in the private sector.²⁸ The TRIPS Agreement, however, which mandates protection of PGRs, has altered the situation. Private-sector companies have now started to undertake R&D in high yielding crops and to use IPRs to secure their investment. Such use of IPRs in PGRs is ostensibly related to food security.

III. INTELLECTUAL PROPERTY RIGHTS RELEVANT TO PLANT GENETIC RESOURCES

Over the past few decades, the issue concerning IPRs in PGRs has evolved significantly. Until the last century, PGRs, which were common heritage, did not qualify as inventions.²⁹ In the course of the 20th century, human intervention superseded the focus on common heritage, leading to the creation of new plant varieties and endowing them with patents or other forms of exclusive IPRs such as PBRs, trademarks, geographical indications and trade secrets.³⁰

General use restriction technologies (GURT) and bag-label contracts are also relevant. In Bangladesh, certain IPRs are considered to be relevant to PGRs. These are patents, trademarks, geographical indications and trade secrets. The most relevant IPRs in PGRs are discussed below.

A. PATENTS

Patents are the most important form of IPR protection today for PGRs, since they provide the strongest protection for investments made in agricultural R&D aimed at improving productivity and attracting capital. The TRIPS Agreement lays down the general principle on patentability. In that context, TRIPS Article 27.1 stipulates that patents shall be available for any invention in all fields of technology, provided that the invention is new, involves an inventive step and is capable of industrial application. However, Article 27.3(b) contains an exception to this general principle in the field of life sciences, biotechnology and genetic engineering. It states that: 'Members may exclude from patentability plants and animals other than microorganisms, and essentially biological processes for the production of plants or

²⁷ *Trade Marks Act, 2009* (ACT NO. XIX of 2009) *Bangladesh Gazette Extra* published 31 August 2010 <http://www.wipo.int/wipolex/en/text.jsp?file_id=197266> 10 December 2010 (hereinafter Trade Marks Act).

²⁸ Savita Mullapudi Narasimhan, 'Towards a Balanced "Sui Generis" Plant Variety Regime: Guidelines to Establish a National PVP Law and an Understanding of TRIPS-Plus Aspects of Plant Rights' (Bureau for Development Policy, United Nations Development Programme, New York, 2008) <<http://www.undp.org/content/dam/aplaws/publication/en/publications/poverty-reduction/poverty-website/toward-a-balanced-sui-generis-plant-variety-regime/TowardBalancedSuiGenerisPlantVarietyRegime.pdf>> 15 December 2009.

²⁹ Kal Raustiala and David G Victor, 'The Regime Complex for Plant Genetic Resources' (2004) 58 *Intl Org* 277.

³⁰ S Verma and M S Sidhu, 'Impact of Intellectual Property Rights on the Indian Seed Industry' (2009) *Man and Development* 67, 67–68.

animals other than non-biological and microbiological processes.' Article 27 is flexible in its protection of plant varieties, since it allows WTO Members to adopt patents or other means.³¹

In Bangladesh, the provisions of the Patents and Designs Act define a patentable invention as 'any manner of new manufacture and includes an improvement and an alleged invention'.³² In that sense, PGR-derived products and processes qualify as inventions and hence are patentable. Plants or plant varieties that are new and derived from earlier varieties may also be patentable since they meet the requirements of invention. The definition of invention is broad since it covers seeds that are new and have industrial application. In line with this definition, PGRs are included within the scope of inventions subject to patent protection.³³

B. PLANT BREEDERS' RIGHTS

In addition to patent systems, new plant varieties are protected by a special *sui generis* PVP system popularly known as PBRs. This permits developers of new plant varieties to control their marketing and use.³⁴ Such rights are similar to patents with the exception that the right holders may only prevent third parties from commercially exploiting the protected materials.

The only pre-existing *sui generis* plant variety protection is provided in the UPOV Convention. This prompts many countries to ratify the UPOV Convention in order to secure compliance with the TRIPS Agreement. Technically, a *sui generis* system may form part of other IPR laws such as patent law. This approach exists in principle in the United States and Australia.³⁵ Alternatively, a *sui generis* system may constitute a law separate from other IPR laws, as sanctioned under the TRIPS Agreement and endorsed by India and Thailand.³⁶

In Bangladesh, the ratification of the TRIPS Agreement has brought IPRs in PGRs to the forefront, especially PBRs. At this moment, its IPR laws do not include provisions on PBRs. To fill the vacuum, its draft Plant Variety Act provides for PBRs as an alternative to patents. This is a preferable means of protection than patents, given the circumstances of the pre-TRIPS Agreement era in which farmers in Bangladesh farmed on the basis of the free sharing of knowledge.³⁷ In addition, Bangladesh opted for PBRs for a number of other reasons. In the first place, compared to patents, PBRs appear less monopolistic to most developing and least developed countries reliant on their agricultural sector. Since agriculture is a sector of primary importance in Bangladesh, the selection of PBRs in the draft Act is a preferable choice

³¹ Jayashree Watal, 'Intellectual Property and Biotechnology: Trade Interests of Developing Countries'(2000) 2(1-3) International Journal of Biotechnology 44.

³² Patents and Designs Act Section 2(8), which states: 'invention' means any manner of new manufacture and includes an improvement and an alleged invention.

³³ Syeda Rizwana Hasan and Tanim Ahmed, 'Hybrid in Bangladesh: Concerns of Farmers (Briefing Paper, No. 4, Bangladesh Environmental Lawyers' Association, Dhaka, 2005).

³⁴ UPOV Convention, Articles 3 and 19.

³⁵ Dan Leskien and Michael Flitner, 'Intellectual Property Rights and Plant Genetic Resources: Options for a *Sui Generis* System' (Issues in Genetic Resources No. 6, IPGRI, Rome, June 1997).

³⁶ Robert E Evenson, 'Intellectual Property Rights and Asian Agriculture' (2004) 1(1) Asian Journal of Agriculture and Development 15, 15–18.

³⁷ Phillipe Cullet, 'Plant Variety Protection in Africa: Towards Compliance with the TRIPS Agreement' (2001) 45(1) Journal of African Law 97, 117–122.

for protecting farmers' rights. Further, subsistence agriculture forms a large part of Bangladesh's agricultural activities. This implies a close link between agriculture and the fulfilment of the food needs of all individuals. Since PBRs provide for flexibilities to reflect countries' specific agro-economic conditions, the draft Plant Variety Act is expected to constitute an appropriate response to the country's subsistence agriculture and to fulfil its food security requirements.³⁸

C. TRADEMARKS

Trademarks can be applied to PGR-based products or services. For instance, trademarks are used to market seeds or spraying services. Trademarks are also important in most food markets. Marks help identify brand names and prevent other companies from benefiting from brand loyalty.³⁹ The TRIPS Agreement provides for the registration of trademarks for agricultural products (e.g. seeds and fertilisers).⁴⁰

In Bangladesh, under the provisions of the Trade Marks Act, trademarks can be applied to goods and services.⁴¹ In that sense, trademarks can be used to market agricultural products, especially seeds, foods or spraying services. They distinguish brand names of PGR-based products and prevent other companies from benefiting from brand loyalty.

D. GEOGRAPHICAL INDICATIONS

Geographical indications, including appellations of origin, are a form of IPRs of importance to PGRs. For the most part, geographical indications relate to PGR-based products — or items derived from these, as in the case of wines and spirits — having originated in a particular region, locality or country, where reputation or some quality or characteristic of the goods is attributable to that origin. Plant varieties developed with traditional knowledge and associated with a particular region can also be protected as geographical indications. The advantage of such protection is that it is not time-bound, unlike plant patents or PBRs. Many see this as a mechanism for raising income in agriculturally based developing economies, though the major users at present are European nations.⁴²

The provisions in the TRIPS Agreement on geographical indications maintain a dual structure of protection. In the first place, the Agreement obliges countries to use legal means to prevent the identification or presentation of a product that would mislead consumers as to its true geographical origin and to prevent acts of unfair competition in this regard. The TRIPS Agreement also calls for a higher level of protection for geographical indications for wines and spirits. The TRIPS Council is engaged in negotiations with a view to accommodating other products including PGRs.⁴³

In Bangladesh, the Trade Marks Act does not follow the TRIPS Agreement mandate for geographical indications, as it does not allow for the registration of a product with a

³⁸ *ibid.*

³⁹ Watal 34 (n 31).

⁴⁰ TRIPS Agreement, Article 15.

⁴¹ Trade Marks Act Section 2(8).

⁴² Watal 44 (n 31).

⁴³ Keith E Maskus, 'Intellectual Property Rights in Agriculture and the Interests of Asian-Pacific Economies' (2006) 29(6) *World Economy* 715.

geographical indication.⁴⁴ However, it is possible to use the common law tort of passing off⁴⁵ to protect geographical indications in the country.

E. TRADE SECRETS

Trade secrets provide protection for any information (whether patentable or not) that has economic value and is prevented from disclosure by firms through reasonable efforts. Trade secrets may be critical for biological materials that are used in production but not sold. Examples include a microorganism used to make a drug or a parent line used to make a hybrid.

The commercial advantage of trade secrets is that the inventor is not required to publish the protected information. Trade-secret protection can be used by the agricultural sector to protect hybrid plant varieties for instance. Trade secrets can be protected against third-party misappropriation through laws relating to unfair competition or to restrictive trade practices or to contract law.⁴⁶ The TRIPS Agreement also requires countries to set out laws defining the nature of unfair competition in this area with the intention of raising the costs of learning technical business secrets through permissible reverse engineering and encouraging labour mobility.⁴⁷

In Bangladesh, trade-secret protection is available under common law. However, it has never been tested. This is also the case with the protection of undisclosed test data submitted for obtaining marketing approval for new agricultural chemicals.

F. OTHER INSTRUMENTS ASSERTING INTELLECTUAL PROPERTY RIGHTS IN PLANT GENETIC RESOURCES

In addition to common IPRs, plant innovators rely on several other means to assert their IPRs. Genetic use restriction technology (GURT) is one of them. It uses terminator genes, which counter the traditional right of farmers to save seeds.⁴⁸ To counter the adverse effects that the development of such technology may have on biological diversity and on farmers' rights, the Cartagena Protocol on Biosafety⁴⁹ effectively appears to be a milestone. This international agreement aims to manage such technology risks and ensure traditional practices of seed saving.⁵⁰ There are certain specific contractual arrangements such as the bag-label

⁴⁴ Trade Marks Act Section 6.1(d).

⁴⁵ In the common law, a person who gains a reputation in connection with the use of a particular mark is entitled to prevent another from passing off goods or services as being those of the owner of the mark, if the work of the latter is likely to injure the former's reputation. See Kok Keng Lau, 'Passing off of Well-Known Trade Marks' (2010) 22 Singapore Academy of Law Journal 426.

⁴⁶ Watal 44 (n 31).

⁴⁷ Maskus 715 (n 43).

⁴⁸ Joseph Gopo and Patricia Kameri-Mbote, 'Biotechnology: A Turning Point in Development or an Opportunity that Will Be Missed' in Ricardo Melendiz-Ortiz and Vicente Sanchez (eds), *Trading in Genes: Development Perspectives on Biotechnology, Trade and Sustainability* (2005) 36-51.

⁴⁹ Cartagena Protocol on Biosafety to the Convention on Biological Diversity, 29 January 2000, 39 ILM 1027.

⁵⁰ Gopo and Kameri-Mbote 47 (n 48).

contracts that control access to genetic resources and the use of hybrids, which ensure the protection of parent lines.⁵¹

Pursuant to Bangladesh's Seeds Ordinance and the Seeds Rules 1998⁵², even the private sector may import and market any non-notified seeds.⁵³ As a result, the importing and marketing of terminator or GURT seeds are also allowed under Section 17(3). Farmer rights groups in Bangladesh vehemently oppose such technology seeds. They seek to raise public awareness of the adverse effects of terminator technology and are pressing the Government to adopt a biosafety regulation in line with the Cartagena Protocol on Biosafety.⁵⁴

In addition, Bangladesh does not provide for (i) bag label contracts, which restrict the use of the materials by farmers and others; (ii) material transfer agreements (MTAs), which define the rights and obligations of users dealing with patented materials; or (iii) technology use agreements (TUAs), which restrict the use of plant genetic material by farmers.⁵⁵

Thus, it appears that initially countries with a significant agricultural sector adopted IPRs in PGRs, either through the existing IPR framework or by amending existing IP laws. In Bangladesh, the Patents and Designs Act and the Trade Marks Act already provided for patents and trademarks for PGRs. However, plant breeders' and farmers' rights were not protected until the TRIPS Agreement entered into force.

IV. THE TRIPS AGREEMENT AND PLANT GENETIC RESOURCES: IMPLICATIONS AND CHALLENGES FOR FOOD SECURITY

At present, intellectual property rights in PGRs have extensive implications for food security because of the linkage between intellectual property and tradable biological resources beginning in the 1980s, and the subsequent institutionalization of IPR protection in the TRIPS Agreement. Pursuant to a crucial and controversial provision in the TRIPS Agreement, WTO Members are obliged to extend IPR protection to plant varieties. This gives rise to the obligation to grant State-supported monopolies on the commercial distribution of scientifically engineered seeds. For the biotech industry, the institution of such protection through PBRs offers the prospect of high yields and encourages commercial breeders, who decades earlier usurped seed innovation from farmers, to invest more in this sector.⁵⁶ However, for many farmers in developing and least developed countries, the expansion of IPRs to include plant varieties marks a departure from the traditional practice of reusing and trading seeds collected from their own fields and strips away their comparative advantage in reproducing seeds. Thus, it poses a threat to their traditional way of life: traditional varieties are pushed aside in favour of purchasing new seeds for every crop.⁵⁷ Many are also concerned about the implications of the

⁵¹ Geertrui Van Overwalle, 'Patent Protection for Plants: A Comparison of American and European Approaches' (1999) 39 IDEA 143.

⁵² 'The Seed Rules, 1998' <<http://www.sca.gov.bd/seedrul.html>> 10 July 2010.

⁵³ M B Dastagiri, 'The Seed Laws of Asian Countries under the WTO and IPR Regime: A Paradigm Shift' (2008) 37(4) Outlook on Agriculture 297.

⁵⁴ See Farhad Mazhar, 'Genetic Resources Conservation and Utilization: The Role of the Farming Communities' (Presented at the National Workshop on Plant Genetic Resources organized by the National Committee on Plant Genetic Resources, BARC, Bangladesh, 26-29 August 1997).

⁵⁵ *ibid.*

⁵⁶ Vandana Shiva, *Biopiracy: The Plunder of Nature and Knowledge* (1997) 1-6.

⁵⁷ Philip M Nicols, 'Trade without Values' (1996) 90 Northwest U L Rev 658.

shift of agricultural research from public to private funding often dominated by multinational companies.⁵⁸

A. THE TRIPS AGREEMENT AND PLANT GENETIC RESOURCES: FOSTERING
COMMERCIALIZATION

The TRIPS Agreement generally fosters the commercialization of PGRs, resulting in laboratory-produced substitutes displacing traditional agriculture-based products. For TRIPS Agreement proponents, the commercialization of PGRs is needed to secure investments, so that more companies become involved in agricultural research and develop technologies specifically designed to enhance food security through higher yields, enhanced disease resistance and greater drought tolerance, making the seeds market competitive in price.⁵⁹ However, this argument runs counter to the commercializing of a number of major agricultural inputs, including seeds and herbicides, and destabilizes local food economies, with far-reaching effects on food security in developing and least developed countries.⁶⁰

Indeed, the commercialization of PGRs is a shift away from local farmer-centred agricultural practices towards ones that are mediated heavily by corporate (often foreign) profiteering interests. Corporate control over farm-saved seeds has implications for local food access and this has led many to link farmers' rights with broader human rights issues, including food sovereignty rights and the right to food.⁶¹ This is because the autonomy of individual farmers, the health of communities and the very functioning of the seed distribution system and the conservation it enables are all tied to farm-saved seeds. From these perspectives, private rights in PGRs, which shift farmer-centred agricultural practices towards those that serve corporate interests, are seen as raising the price of patented seeds compared to other seeds, thus impacting food security.⁶²

B. THE TRIPS AGREEMENT AND PLANT GENETIC RESOURCES: STRIPPING OFF COMPARATIVE
ADVANTAGE

In comparison with most fields of industrial innovation, innovation in plant breeding results in a self-reproducing organism. Thus, imitation of the agricultural product is relatively easy and comparatively advantageous to incorporate into farming operations. With the use of self-reproducing organisms and biotechnology, both industrialized and developing countries, such as the United States, Europe, China, India, Brazil, and Thailand have dramatically increased their agricultural production of cash crops including soybeans, peas, cereals and

⁵⁸ Craig Borowiak, 'Farmers' Rights: Intellectual Property Regimes and the Struggle over Seeds'(2004) 32(4) *Politics Society* 511, 512.

⁵⁹ P O Goldsmith, D K Nauriyal and W Peng, 'Seed Biotechnology, Intellectual Property and Agricultural Competitiveness' in Jay P Kesan (ed), *Agricultural Biotechnology and Intellectual Property: Seeds of Change* (2007) 31.

⁶⁰ Fred Magdoff and Brian Tokar, 'Agriculture and Food in Crisis: An Overview' 61(3) *Monthly Review* (July 2009) <<http://www.monthlyreview.org/090701magdoff-tokar.php>> 25 March 2010.

⁶¹ Hans Morten Haugen, Manuel Ruiz Muller and Savita Mullapudi Narasimhan, 'Food Security and Intellectual Property Rights: Finding the Linkages' in Tzen Wong and Graham Dutfield (eds), *Intellectual Property and Human Development: Current Trends and Future Scenarios* (2011) 123-124.

⁶² Borowiak, above n 58, 522-530.

corn.⁶³ In addition, developing and least developed countries use such agricultural comparative advantage freely in order to reduce staple food prices.⁶⁴ Intellectual property rights that are introduced in PGRs through the TRIPS Agreement are likely to dismantle the comparative advantage, and force farmers under contract to repurchase seeds every year, which prohibits them from saving seeds and selling them to other producers.⁶⁵

In Bangladesh, PVP, as projected in the draft Plant Variety Act, supposedly ensures PBRs by removing farmers' comparative advantage in exchanging or selling seeds and requiring royalty payments each time seeds are planted. In addition, it requires the Patents and Designs Act to incorporate the patenting of biotechnological products or processes. This is expected to result in higher prices for food, seeds, agricultural chemicals, herbicides and other agro-products made from patented biotechnology, as is already the case in TRIPS-compliant developing countries such as India and Thailand.⁶⁶

C. THE TRIPS AGREEMENT AND PLANT GENETIC RESOURCES: CREATION OF PRIVATE MONOPOLY RIGHTS

By applying IPRs to PGRs, the TRIPS Agreement protects the interests of private capital. However, private property rights over genetic resources result in monopolies. Such privatization of PGRs has far-reaching environmental and social consequences, including food insecurity, because the process of commercialization affects and undermines other forms of use and alternative ways of shaping the societal relationships with nature.⁶⁷ In addition, private property rights and the resulting privatization and monopolization of genetic resources threaten the principle of the free exchange of seeds, which is essential for the development of agriculture and the creation of plant genetic diversity. This process is often criticized as biopiracy, which signifies a problem of illegal appropriation as well as the monopolization of resources through IPR protection.⁶⁸

Under the Patents and Designs Act in force in Bangladesh, biotechnological products or processes are patentable, since they fall within the broad definition of invention. In addition, in the draft Plant Variety Act, the PVP is in line with the UPOV Convention, as required by the United States-Bangladesh and the European Union-Bangladesh bilateral treaties. All such requirements result in genetic resources becoming private properties in Bangladesh. This means that foodstuffs, seeds, agricultural chemicals, herbicides and other agro-products derived from biotechnology are likely to be in private hands, especially in multinational companies through

⁶³ Carl E Pray and Anwar Naseem, 'Supplying Crop Biotechnology to the Poor: Opportunities and Constraints' (2007) 43(1) *Journal of Development Studies* 192.

⁶⁴ Ryan Cardwell and William A Kerr, 'Protecting Biotechnology IPRs in Developing Countries: Simple Analytics of a Levy Solution' (2008) 59(2) *Journal of Agricultural Economics* 217.

⁶⁵ David Lea, 'The Expansion and Restructuring of Intellectual Property and Its Implications for the Developing World' (2008) 11(1) *Ethical Theory and Moral Practice* 37.

⁶⁶ U K Deb, M J H Javed, and M A Razaque, 'Plant Genetic Resources and Farmers' Rights: The Case of Bangladesh' in Ratnakar Adhikari and Kamalesh Adhikari (eds), *Farmers' Rights to Livelihood in the Hindu Kush-Himalayas* (2003) 68–83.

⁶⁷ Plahe 1197–98 (n 13).

⁶⁸ Christoph Görg and Ulrich Brand, 'Contested Regimes in the International Political Economy: Global Regulation of Genetic Resources and the Internationalization of the State' (2006) 6(4) *Global Environmental Politics* 101, 110.

patents or other IPRs. This encourages multinational companies to take the opportunity to monopolize the market and charge higher prices for vital products including foodstuffs.⁶⁹

D. THE TRIPS AGREEMENT AND PLANT GENETIC RESOURCES: SHIFTING PUBLIC-FUNDED RESEARCH TO PRIVATELY FUNDED RESEARCH

Before the TRIPS Agreement came into force, most new plant varieties in openly pollinated plants were developed by publicly funded research programmes or institutes, commercialized on a concessionary basis and often given to farmers at nominal or no charge.⁷⁰ At that time, it was believed that private firms could not capture sufficient returns on investments in R&D in this area and as such, governments intervened to fund research to correct this market failure by different forms of government subsidy and support.⁷¹ Under the TRIPS Agreement, the government's role of promoting agricultural research and supplying seeds at nominal costs has been scaled back.⁷² At present, agriculture in developing and least developed countries fails to obtain government agricultural subsidies and other benefits for farmers. In addition, those government agencies involved in agricultural research concentrate on biotechnology and are in the process of patenting plant genetic materials and seeds. Such cutting of subsidies and patenting of PGRs are likely to have adverse effects on food security.⁷³

Furthermore, the focus on the biotechnology industry appears to be a serious competition issue.⁷⁴ This is because food security is at risk since the technologies are overpriced to the exclusion of small farmers and there is no alternative source of new technologies, particularly from the public sector.⁷⁵ In Bangladesh, agriculture has remained a key source of livelihood for farmers for centuries. Hence, in common with other least developed countries, Bangladesh concentrates on agricultural production and offers agricultural subsidies, even from the foreign aid that forms a substantial part of the national budget.⁷⁶ However, currently the various donors do not encourage the country to invest in agriculture, which is likely to affect food security.

⁶⁹ See Farhad Mazhar, 'Nayakrishi Experience: Addressing Food Crisis through Biodiversity-Based Ecological Production Systems' (Presented at Policy Dialogue Series organized by UNDP, Dhaka, 8 July 2008).

⁷⁰ Carl E Pray and Umali-Deininger, 'The Private Sector in Agricultural Research Systems: Will it Fill the Gap?' (1998) 26(6) World Development 1127.

⁷¹ James D Gaisford, Jill E Hobbs and William A Kerr, 'Will the TRIPS Agreement Foster Appropriate Biotechnologies for Developing Countries?' (2007) 58(2) Journal of Agricultural Economics 199.

⁷² Cullet 97 (n 37).

⁷³ *ibid.*

⁷⁴ *ibid.*

⁷⁵ *ibid.*

⁷⁶ Kanchana Kariyawasam, 'Access to Biological Resources and Benefit Sharing: Exploring a Regional Mechanism to Implement the Convention on Biological Diversity in SAARC Countries' (2007) European Intellectual Property Review 325.

E. THE TRIPS AGREEMENT AND PLANT GENETIC RESOURCES: MISBALANCING BIO-DIVERSITY

In order to maximize profits, the TRIPS Agreement also allows seed companies to develop bioengineered varieties dependent upon agrochemicals, including fertilisers, herbicides and insecticides. This induces farmers to buy such inputs and pay heavy royalties to multinational companies and various taxes include value-added tax (VAT) to the government.⁷⁷ In addition, in order to secure private rights, the TRIPS Agreement encourages monocropping, which creates the possibility of epidemics because genetically uniform crops are extremely vulnerable to diseases. Perhaps the most striking example is the corn blight, which struck the United States in 1970; similar epidemics continue to occur in developing countries.⁷⁸ In addition, the increasing dependence of small farmers on the biotechnology industry, which the TRIPS Agreement fosters, raises fears that, in the future, small farmers might have a low number of patent-free seed cultivars at their disposal, which will prove less efficient than patented seeds and produce smaller yields.⁷⁹

Furthermore, alongside the shift to agricultural biotechnology research and the rise and expansion of IPRs in PGRs, there has been a redirection of research. The focus is on crops that will earn high profits with concomitant neglect of unprofitable subsistence crops.⁸⁰ Further, the shift from agricultural to industry research increasingly edges out subsistence farmers, who rely on seed saving and maintain and develop farmer landraces. This results in the rapid disappearance of *in-situ* genetic conservation methods and related farming knowledge.⁸¹

F. THE TRIPS AGREEMENT AND PLANT GENETIC RESOURCES: ACCESS TO AND BENEFIT SHARING OF SUCH RESOURCES

The recognition of farmers' rights in different international instruments, including the Convention on Biological Diversity forms the basis of efforts to facilitate farmers' access and benefit-sharing of PGRs as monetary and non-monetary benefits in the form of access fees, up-front payments, royalties, licence fees and the like. However, although the TRIPS Agreement was adopted after the Convention on Biological Diversity, it makes no reference to the Convention on Biological Diversity. Agriculture-reliant developing countries are beginning to include an access and benefit-sharing provision in most of their biodiversity legislation. Bangladesh's draft Plant Variety Act and the draft Biodiversity Act include access and benefit sharing.⁸²

V. NEW STRATEGIES NEEDED

In the development of national and international frameworks for plant variety innovations, policymakers need to be aware of the diverse perspectives surrounding the use and

⁷⁷ Lea 37 (n 65).

⁷⁸ R Kennedy, 'International Conflicts over Plant Genetic Resources: Future Developments' (2006) 20(1) *Tul Envtl L J* 1, 2–5.

⁷⁹ Christoph Baumgartner, 'Exclusion by Inclusion? On Difficulties with Regard to an Effective Ethical Assessment of Patenting in the Field of Agricultural Biotechnology' (2006) 19 *Journal of Agricultural and Environmental Ethics* 521, 528–530.

⁸⁰ Pray and Naseem 192 (n 63).

⁸¹ Maskus 715 (n 43).

⁸² Draft Biodiversity Act Section 4 and 18; Draft Plant Variety Act Section 10, 11 and 22.

breeding of plants.⁸³ With this background in mind, an enhanced framework for least developed countries such as Bangladesh requires (a) reasonable national regulatory systems; and (b) affiliation with an international coalition to exert pressure to ensure that international agreements, including those concerned with trade, are responsive to food security.

A. FRAMING NATIONAL REGULATORY SYSTEMS

As part of the formation of national regulatory systems, a least developed country such as Bangladesh is obliged either to introduce patents for new plant varieties or have an effective *sui generis* law to protect IPRs in PGRs by 1 July 2013. In addition, the protection provided to trademarks, geographical indications and trade secrets needs to be enhanced, in order to comply with the requirements of the TRIPS Agreement.

1. Introducing patents for new plant varieties by redefining 'Invention'

The definition of the term 'invention' acts as a yardstick for identifying patentable plant varieties products or processes. The TRIPS Agreement does not define the term invention and leaves it to Member countries to define. From such a standpoint, the term 'invention' must be of a technical character to the extent that it must relate to a technical field, concern a technical problem, and possess technical features in terms of the matter for which the invention is sought.⁸⁴ This interpretation is confirmed in jurisprudence with the comment that an invention must have a technical character, provide a technical contribution to the art and solve a technical problem.⁸⁵ The same approach is taken in legal doctrine throughout the Western world; such doctrine states that inventions are creations in the technical field containing a technical teaching.⁸⁶ Therefore, in the context of a patentable invention, knowledge is mainly considered to be technical knowledge.⁸⁷

Despite such instances and discretions, the Patents and Designs Act in Bangladesh provides a broad and vague definition of the term invention: any manner of new manufacture and includes an improvement and an alleged invention.⁸⁸ According to this definition, new plants or plant varieties are patentable inventions.

To avoid problems of access arising from the monopoly conferred by a patent, Bangladesh, a least developed country reliant on its agricultural sector, has the option to exclude plant varieties from patentable inventions and switch to *sui generis* PVP. As another option, Bangladesh may redefine the term 'invention'.

⁸³ Daniel Robinson, 'Sui Generis Plant Variety Protection Systems: Liability Rules and Non-UPOV Systems of Protection' (2008) 3(10) *JIPLP* 659, 664–665.

⁸⁴ Uwe Fitzner, 'Laws and Regulations for the Protection of Biotechnological Inventions' in Jose Luis Barredo (ed), *Microbial Processes and Products* (2005) 465–494.

⁸⁵ Van Overwalle 585 (n 51).

⁸⁶ *ibid.*

⁸⁷ *ibid* 587.

⁸⁸ Patents and Designs Act Section 2(8).

Currently, Bangladesh's draft Patent Act 2013 (draft Patent Act)⁸⁹ is the subject of extensive discussion. It does not exclude plant varieties from patentability, but seeks to redefine invention. It defines the term 'invention' in imprecise and long-winded wording. It includes any new, sufficiently inventive and useful art, process, method or manner of manufacture, machine, apparatus or other article or substance produced by manufacture and including any new, sufficiently inventive and useful improvement thereof, and an alleged invention.⁹⁰ However, the wording 'sufficiently inventive and useful improvement' is capable of encompassing all substances that exist in nature that are discovered or the subject of bioprospecting.

2. Geographical indications

In Bangladesh there are many agricultural products and species with geographical indications. Such products include plant varieties, medicinal plants or traditional knowledge.⁹¹ The protection of IPRs in the form of geographical indications may be claimed for such agricultural products under the common law tort of passing off. However, this common law tort is not used widely in Bangladesh and hence requires legislation or an amendment to Section 6.1(d) of its Trade Marks Act, which can provide geographical protection to its own geographical indications or those of trading partners on the basis of reciprocity. It may also be possible for the holders of traditional knowledge in goods produced and sold using geographical indications to register and protect their knowledge under such law. India enacted such an Act under the name of the Geographical Indication of Goods (Registration and Protection) Act, 1999, in order to provide the higher level of absolute protection to geographical indications irrespective of origin.⁹²

3. Trade secrets

Protection of trade secrets is available in Bangladesh under the common law tort of passing off. However, owing to its non-popularity and difficulty of proving the claim, Bangladesh needs to introduce the legal basis to extend such protection to cover third parties who directly or indirectly disclose a trade secret. Bangladesh also needs legislation to protect undisclosed test data submitted to the DPDT for obtaining marketing approvals for new agricultural chemicals, fertilisers, herbicides, and pesticides.

4. Plant variety protection (plant breeders' rights)

Intellectual property right regimes such as PVP are established to help achieve societal goals. Policymakers in least developing countries such as Bangladesh should therefore view PVP as a tool to be adapted and used for achieving goals of national agricultural development, rather than an obligation imposed by industrialized countries.⁹³

⁸⁹ Patent Law, 2007 (Department of Patents, Designs and Trademarks, Ministry of Industries, Government of the People's Republic of Bangladesh 10 January 2007) [hereinafter draft Patent Act 2007].

⁹⁰ Draft Patent Act 2007 Section 2(14).

⁹¹ Mahfuz Ullah, *Intellectual Property Rights and Bangladesh* (2002) 61–62.

⁹² Siriginidi Subba Rao, 'Indigenous Knowledge Organization: An Indian Scenario' (2006) 26 *International Journal of Information Management* 224.

⁹³ Robert Tripp, Niels Louwaars and Derek Eaton, 'Plant Variety Protection in Developing Countries: A Report from the Field' (2007) 32 *Food Policy* 354.

In view of such an understanding, least developed countries such as Bangladesh can find a solution proposed in the context of the interpretative resolutions to the IUPGRFA by recognizing concurrently and equally the rights of farmers and the rights of commercial breeders.⁹⁴ Indeed, the TRIPS Agreement allows developing nations to construe such an option with the use of the term '*sui generis*' since it provides the discretion to determine the type and design of plant protection regime. It enables developing countries to promote innovative plant breeding, while preserving national objectives such as the protection of biodiversity, traditional farming, and food security.

However, Bangladesh's draft Plant Variety Act that strengthens PBRs with the expectation that it will promote trade in Bangladesh does not define farmers as breeders. The sidelining of farmers through overprotection would affect trade and could lead to food security issues in Bangladesh. Therefore, while strengthening PBRs, incorporating farmers as breeders would preserve farmers' traditional farming practices, farmers' innovations from selection and maintaining of seeds, farmers' traditional conservation of biodiversity and farmers' access to benefit-sharing mechanisms. Thus, national priorities in agriculture-focused Bangladesh would be met. This would also balance the interests of the variety of actors (especially commercial breeders and farmers) involved in agricultural trade. For example, such a strategy is consistent with the interests of commercial breeders and farmers in India and Thailand. They promote the seed industry by encouraging seed trade, boosting exports and protecting seed quality.⁹⁵

In order to benefit from defining farmers as breeders in Bangladesh, a review of the existing Seeds Ordinance, the Seeds Rules and the Seeds Policy⁹⁶ is necessary, along with the insertion of provisions therein to regulate the sale, import and export of seeds, as the TRIPS Agreement does not require governments to regulate seed trade. To that end, the existing seeds framework needs to be harmonized with the draft Plant Variety Act and the Biodiversity Act. This will effectively nullify any compromise in the rights of farmers to save, resow or exchange seeds. It will also effectively put an end to the registration and sale of an existing variety or a farmers' variety, or the authority to issue compulsory licensing to control prices and regulate the supply of seeds under public interest conditions.

5. Limiting patents and plant breeders' rights through compulsory licensing

Limiting patents and plant breeders' rights can play a role in reducing and minimizing food and livelihood security concerns in a least developing country such as Bangladesh. The limitation on patents and PBRs can be imposed through compulsory licensing. The draft Plant Variety Act and the draft Patent Act should introduce compulsory licensing of patents and PBR-protected products: (a) where circumstances of national security concerns exist; (b) where such are required for the maintenance of nutritional stability and prevention of monopoly; (c) where purposes of other public interests subsist; and (d) where there has been no sale of the propagating material of the new plant variety or the sale thereof is of an insufficient quantity for the needs of the people within the country or the price thereof is overpriced.

⁹⁴ Cullet 117–22 (n 37).

⁹⁵ See Srividhya Ragavan and Jamie Mayer O'shields, 'Genetic Use Restriction Technologies: Do the Potential Environmental Harms Outweigh the Economic Benefits?' (2007) 20 *Geo Intl Env'tl L Rev* 97.

⁹⁶ The National Seed Policy' <<http://www.sca.gov.bd/seedpol.html>> 10 July 2010.

6. Access to and benefit sharing of plant genetic resources

Access to and benefit sharing of PGRs are the key elements in addressing major food and livelihood security concerns in a least developed country such as Bangladesh. To this end, farmers should be allowed to choose from a wide range of germplasm and samples that would be best suited to their present needs and have access to them. They should also have the right to use their own seeds. They should be free to improve germplasm (varieties and breeds) with their own materials and with those introduced from other sources. Farming communities should be free to sell the harvested commodity, to save seed (on a non-commercial basis) for replanting and to share and exchange seeds. Farmer-to-farmer seed exchange and the sale of seed by farmers should be allowed; however, a farmer should not be entitled to such rights in cases where the sale is for the purpose of reproduction under a commercial marketing arrangement. There should also be a broad access framework, either preventing the biopiracy of PGRs or their removal from the country by local agents through local access, or the privatization by foreigners for profiteering purposes. It could also allow dissemination at the lowest possible cost to all farmers if the biopirated variety is a staple food crop.⁹⁷

B. RATCHETING UP INTERNATIONAL COALITION

A *sui generis* plant variety protection system, as set out in the review of the TRIPS Agreement, should not be developed in isolation. Given that plant varieties are only a subset of biological resources, all WTO Members and countries that are parties to the Convention on Biological Diversity should work together to draft a single all encompassing law. This law should recognize farmers as breeders and ensure their rights, taking into account the requirements of the Convention on Biological Diversity and the TRIPS Agreement.

VI. CONCLUDING REMARKS

On the one hand, IPRs in PGRs transform agricultural goods or services from common heritage to private property by restricting their uses. As a consequence, IPRs, as a tool to secure the investment of private individuals in PGRs, cause hardship in developing and least developed countries due to elevated prices of agricultural products in the guise of monopoly power. This forces farmers into dependence on engineered seeds and other agricultural inputs. These factors are linked to insecure access to food.

On the other hand, the TRIPS Agreement provides some exceptions and flexibilities, including the discretion to define patentable inventions, to choose between patents and PBRs, and to provide for compulsory licensing. This study recommends that Bangladesh align itself with other least developed countries, with a view to ensuring that the review of Article 27.3(b) of the TRIPS Agreement favours their agricultural needs. Furthermore, it encourages least developed countries to take advantage of the flexibilities provided in TRIPS, in order to safeguard their food sector and to protect farmers' rights. Such policy decisions economically affect poor farmers as well as the food sector in Bangladesh. These decisions also have the potential to influence IPR policies in other least developed countries.

With this end in view, this study shows a clear need for public policy interventions to promote the utilization and the flow of PGRs. It also urges Bangladesh to frame legislation to

⁹⁷ Nirmal Sengupta, 'Traditional Knowledge and Intellectual Property Right' in Paramita Dasgupta (ed), *The WTO at the Crossroads* (2009) 100–115.

suit its agricultural development needs, fulfil the TRIPS Agreement mandates and respect other commitments arising from the Convention on Biological Diversity and the ITPGRFA. This will promote farmers' rights, ultimately ensuring access to food.
