

TRIPS Agreement and Plant Genetic Resources: Implications and Challenges for Food Security in Least Developed Countries like Bangladesh

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Introduction

The World Trade Organization (WTO) *Agreement on Trade-Related Aspects of Intellectual Property Rights* (TRIPS)¹ establishes intellectual property rights (IPRs)² in plant genetic resources (PGRs), especially in plant varieties and biotechnology, by way of patents, plant varieties protection (PVP) and the likes. This holds a one-size-fits-all approach for all countries irrespective of their standing in terms of making economic development and meeting basic needs including food security. In fact, developed countries have gradually increasing technology that helps them genetically modifying PGRs. Such use of technology often brings in better yields and ensures food security. Moreover, rents made out of the trade of PGRs-based products also encourage further research and development (R&D) for improving PGRs. This means with IPRs in PGRs, there will be more appropriable yields ensuring more security for food. However, least developed countries (LDCs) like Bangladesh lag behind R&D and often can not afford importing technology that helps genetic modification of PGRs. They are rather used to the free use of PGRs at all levels. Such free use helps farmers producing crops at low costs and thus helps meeting food security. Again, better yields with the use of genetic technology in their small pieces of land are proven to be helpful for LDCs like Bangladesh in meeting food security. However, the use of technology with rents usually increases the costs of food production which then jeopardises food security.

With the arrival of the TRIPS, two previously less related domains, intellectual property and international trade are now connected. This makes PGRs commodities of trade since it obliges member states to offer IPRs including patents or sui generis (of its own kind) protection over

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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].

² It was customary to refer to industrial and intellectual property rights. The term 'industrial' was used to cover technology-based subject areas like patents, designs and trade marks. '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 commercialise the inventions and simultaneously stop others from doing so unless rents are paid on licensing; for details, see M Rafiqul Islam, *International Trade Law of the WTO* (2006) 379–380.

microorganisms, microbiological processes and non-biological processes used for the production of plants and animals, and plant varieties. This also forbids countries using IPRs goods without rents. Such obligations are found to restrict access to PGRs which were once free to all. This contention is compounded by another fact that the TRIPS is not primarily an agreement about food and agriculture, and hence, it does not refer to any notion of food security.

With such TRIPS mandate in view, Bangladesh prepares a draft Patent Law 2007 paving the straight way for patenting PGRs. In addition, bilateral investment treaties, namely, the *United States-Bangladesh Bilateral Investment Treaty 1986* and the *European Union-Bangladesh Cooperation Agreement on Partnership and Development 1999* require it to enter into consultation and joining negotiations with the *International Convention for the Protection of New Varieties of Plants* (known as UPOV after its French acronym) containing a sui generis protection.³ Accordingly, it gets the draft *Plant Variety and Farmers' Rights Protection Act* (draft Plant Variety Act) ready containing a UPOV style sui generis protection system as required by the TRIPS. In addition, being a party⁴ to the *Convention on Biological Diversity* (CBD),⁵ and the *International Treaty on Plant Genetic Resources for Food and Agriculture* (ITPGRFA)⁶, and being persuaded by the local and international entrepreneurs, the country drafts 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 sparks extensive debate in Bangladesh between and amongst policy makers and the civil society. Elemental to their 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, re-sow, exchange and sell seeds. In fact, making a right balance between the rights of breeders and farmers can

³ *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].

⁴ Bangladesh signed and ratified the *Convention on Biological Diversity* in 1992 and 1995 respectively [hereinafter CBD]. *Bangladesh International Treaty on Plant Genetic Resources for Food and Agriculture* signed on 17 October 2002 and ratified on 14 November 2003 [hereinafter ITPGRFA].

⁵ CBD, done at Rio de Janeiro, 5 June 1992 (entered into force 29 December 1993) 31 ILM 822.

⁶ ITPGRFA, 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].

establish a regime that may help food production in a densely populated country sufficiently and at a low cost and can cause food access secured.

Revisiting the relationship between the TRIPS and PGRs and its major implications and challenges regarding food security for LDCs, particularly Bangladesh, this paper examines the issue of IPRs regimes that have most relevance to PGRs. It then focuses on the existing Bangladeshi laws that have relevance to PGRs—and the draft laws proposing plant variety protection that Bangladesh needs to undertake as part of the TRIPS compliance. During the analysis, this paper attempts to summarise the progress to date in establishing IPRs in PGRs in Bangladesh. Based on these observations, recommendations for the design and operation of an intellectual property system respecting PGRs and food security for Bangladesh are offered.

Relationship between IPRs in PGRs 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, often freely available in the public domain and are protected by IPRs.⁸ This protection of IPRs in PGRs-cum-public goods holds significant elements of controversy over food security between plant breeding industries and farmers based in developing and least developed countries.

The TRIPS mandated IPRs in PGRs is supported by plant breeding industries with the view that protection of plant genetic inventions in the name of PVP is taken to secure incentives for plant breeding, and to boost 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 number of biotechnology rich developed countries, thus causing price-hikes of agricultural products and risking food security.¹⁰ The contention also maintains that the breeder-cum-seller incentivising innovation system often ignores farmers based in developing countries and LDCs, although they possess unique local knowledge about their food needs and the technical capacity for follow-on innovations that meet those needs.¹¹ Such contention is further supported by the fact that with the patronage of the

⁸ Rahul Goel, 'Protection and Conservation—TRIPs and CBD: A Way Forward' (2008) 3(5) *Journal of Intellectual Property Law & Practice* 334.

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, 'Globalising 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 Law Review* 2275.

TRIPS, multinational companies (MNCs) make use of herbicide-tolerant, insect-resistant and genetic restriction technologies.¹² Such uses are found to affect 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 in using and reusing PGRs and thus creates challenges on achieving food security.¹³ In addition, MNCs focus only on the handful of crops with high appropriable value, including maize, cotton, soybeans and canola. Such selective production of crops often does not help meeting food security for three-fourths population of the world since they are dependent on cereal crops like rice, wheat and others.¹⁴

Further, the TRIPS mandated IPRs in PGRs is supported with the view that any increase in cereal yields made out of IPRs initiated reward is crucial for meeting food security. In addition, the fact as the TRIPS claims, higher yields come out of genetically modified PGRs appears to be the most welcome initiative in achieving food security for the mass people in South Asia and sub-Saharan Africa due to the limited amount of cultivatable land therein. So, to meet this demand of food security, growing crops by using bio-technology is a reality as is the acceptance of breeders' dominance. This acceptance means compliance with the TRIPS endorsed PVP and IPRs rules in the name of patents and sui generis protection and boosting agricultural products that improve food security.

As a sui generis protection of PGRs and also as an exception to patents, plant breeders' rights (PBRs) appear in Europe under the UPOV. However, the TRIPS does not have any reference to PBRs. Instead, it designs 'farmers' privileges' as exceptions to patents. Developing countries and least developed countries accept the TRIPS exception of 'farmers' privileges' in the name of 'farmers' rights'. However, the farmers' rights that counterclaim PBRs require not only protection for traditional agrarian practices but also recognition of farmers as breeders.¹⁵ It creates an opportunity for developing and least developed countries to establish a unique system that serves both ends.¹⁶ It obliges them to enhance IPRs as required by the TRIPS while protecting genetic resources to promote innovation in PGRs in line with the UPOV meaning boosting agricultural

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.

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.

products that improve food security.¹⁷ It also encourages them to uphold the rights of farmers in line with the CBD,¹⁸ the ITPGRFA¹⁹ and other non-binding obligations including the *International Undertaking on Plant Genetic Resources for Food and Agriculture* (IUPGRFA)²⁰ that recognise farmers' unique local knowledge about their food security and the 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 MNCs, but also varieties developed by farmers or nongovernmental organizations (NGOs).²² It also aims to ensure that bio-piracy (utilisation of resources in developing countries by developed countries to create profitable products without compensation) does not occur.²³

In Bangladesh, intellectual property laws arriving via colonial means or on the basis of the defunct rule of continuity after decolonisation did not have 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. IPRs in PGRs are made into application through the *Patents and Designs Act, 1911* (Patents and Designs Act)²⁶ and the *Trade Marks Act, 1940*, currently substituted by the *Trade Marks Act, 2009* (Trade

¹⁷ *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].

¹⁸ *Convention on Biological Diversity*, done at Rio de Janeiro, 5 June 1992 (entered into force 29 December 1993) 31 ILM 822 [hereinafter CBD].

¹⁹ *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].

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, above n 9, 187-189.

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).

Marks Act)²⁷. However, Bangladesh did not frequently experience private rights of IPRs in PGRs. This is because the majority of PGRs research was conducted by the public sector which did not bother IPRs in PGRs. In addition, previously private sector did not have much concentration in this field.²⁸ However, the TRIPS provisions covering PGRs as IPRs protectable subject matter has changed the scenario. Private sector companies are now in the field to make R&D for high yielding crops and to secure their investment, they are concentrating on IPRs in PGRs. Such establishment of IPRs in PGRs is taken to have relations with food security.

IPRs Relevant to PGRs

Over the past few decades the issue concerning IPRs in PGRs has evolved significantly. However, until the last century PGRs which were in common heritage did not qualify as inventions.²⁹ In the course of the 20th century, human intervention supersedes the common heritage treatment, leading to the creation of new plant varieties from the heritage and endowing the varieties with patents or other forms of exclusive IPRs such as PBRs, trademarks, geographical indications (GIs) 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, GIs and trade-secrets. The most relevant IPRs in PGRs are considered below.

(I) Patents

Patents act as the most important IPRs today for PGRs since they provide the strongest protection to investments made in agricultural R&D to improve productivity and attract further capital. When the TRIPS comes in, it lays down the general principle with regard to patentability. In maintaining the line, Article 27.1 of the TRIPS stipulates that patents shall be available for any inventions in all fields of technology, provided that they are new, involve an inventive step and are capable of industrial application. However, Article 27.3(b) contains exclusion to this wide 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

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 210 (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://content.undp.org/go/cms-service/download/asset/?asset_id=1943122> 15 December 2009.

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

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

processes for the production of plants or animals other than non-biological and microbiological processes. However, Article 27 is flexible in its protection of plant varieties since it allows member countries to adopt patents or other means.³¹

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

(II) PBRs

Along with patents, 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 operate like patents with the exception that the right holders can only prevent third parties from commercially exploiting the protected materials.

In fact, when the TRIPS comes into force the only pre-existing sui generis plant variety protection is provided in the UPOV Convention. This makes many countries ratify the UPOV Convention upon the ratification of the TRIPS. Technically, such a sui generis system could form a part of other IPRs laws, such as the patent law. This approach exists in principle in the US and Australia.³⁵ Alternatively, it could be included in a separate law for its entirety and endorsement in the TRIPS as India and Thailand have chosen.³⁶

In Bangladesh, the TRIPS acceptance has brought IPRs in PGRs into the forefront, especially PBRs. At the moment, its IPRs laws do not have provisions as regards PBRs. To fill the vacuum, its draft Plant Variety Act finds PBRs relatively better as an alternative to patents in the circumstances when operating on the basis of the free sharing of

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). It says: '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 & 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.

knowledge in the pre-TRIPS era.³⁷ In addition, Bangladesh takes up PBRs for a number of reasons. In the first place, compared with patents, PBRs appear less monopolistic to most agriculture-prone developing and least developed countries. Since agriculture is a sector of primary importance in Bangladesh, selecting PBRs in the draft Act is a smarter choice for the purposes of 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 the PBRs bear 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 the fulfilment of its food security.³⁸

(III) Trademarks

Trademarks can be applied to PGRs-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 provides for the registration of agricultural products (e.g. seeds, fertilisers) with trademarks.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 PGRs based products and prevent other companies from benefiting from brand loyalty.

(IV) GIs

GIs, including appellations of origin, are an important form of IPRs of interest to PGRs. For the most part, GIs relate to PGRs-based products—or items derived from the same, as in the case of wines and spirits—having originated in a particular region, locality or country, where reputation or some quality characteristic of the goods is essentially attributable to that origin. Plant varieties developed with traditional knowledge (TK) and associated with a particular region can also be protected as GIs. 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 incomes in agriculturally based developing economies, although the major users at present are European nations.⁴²

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

³⁸ *Ibid.*

³⁹ Watal, above n 31, 34.

⁴⁰ TRIPS Agreement Article 15.

⁴¹ Trade Marks Act Section 2(8).

⁴² Watal, above n 31, 44.

For GIs, the TRIPS maintains a dual structure of protection. In the first place, it 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 also calls for a higher level of protection for GIs only in wines and spirits. To accommodate other products including PGRs, the TRIPS Council is holding negotiations.⁴³

In Bangladesh, the Trade Marks Act does not follow the TRIPS mandate for GIs since it does not allow the registration of a product with GI.⁴⁴ However, it is possible to use the common law tort of 'passing-off'⁴⁵ to protect GIs in the country.

(V) 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 not sold, but rather used in production. Examples include a microorganism used to make a drug or a parent line used to make a hybrid. The commercial advantage of trade secrets in these cases is that the inventor is not required to publish the protected information. Trade secret protection can be used by the agricultural sector to protect, for instance, hybrid plant varieties. 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 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.

(VI) Other Instruments Asserting IPRs in PGRs

In addition to common IPRs, plant innovators rely on a few other means to assert their IPRs. The GURT is one of them. It uses the terminator genes

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

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, above n 31, 44.

⁴⁷ Maskus, above n 43, 715.

which run counter to the traditional right of farmers to save seeds.⁴⁸ To get rid of such technology seeds that get in the way of farmers' rights, the *Cartegena Protocol on Biosafety*⁴⁹ appears as a milestone. It tends to manage such risks of technology and ensure traditional practices of seed saving.⁵⁰ There are certain specific contractual arrangements, such as the bag-label contracts that control access to genetic resources and the use of hybrids, which ensures the protection of parent lines.⁵¹

In Bangladesh, with the use of the Seeds Ordinance and the Seeds Rules 1998,⁵² even the private sector can import and market any non-notified seeds.⁵³ As a result, the importing and marketing of terminator or GURT seeds is also allowed under Section 17(3). Farmers' rights groups in Bangladesh vehemently oppose such technology seeds. They are trying to make people aware of the effects of the terminator technology and pressing the government to adopt a bio-safety regulation in line with the *Cartegena Protocol on Biosafety*.⁵⁴

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

Thus, it appears that the beginning of IPRs in PGRs took place in agriculture-prone countries either via the existing IPRs framework or by making necessary amendments to the framework. For Bangladesh, the Patents and Designs Act and the Trade Marks Act already provide for IPRs in PGRs in the name of patents or trademarks. However, plant breeders' and farmers' rights did not enjoy their subsistence until the arrival of the TRIPS.

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, above n 48, 47.

⁵¹ Geertrui Van Overwalle, 'Patent Protection for Plants: A Comparison of American and European Approaches' (1999) 39 *IDEA: Journal of Law & Technology* 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 organised by National Committee on Plant Genetic Resources, BARC, Bangladesh, 26-29 August 1997).

⁵⁵ *Ibid.*

TRIPS Agreement and PGRs: Implications and Challenges for Food Security

Intellectual property rights in PGRs have taken on extensive implications for food security, with the linkage between intellectual property and tradable biological resources in the 1980s and with the subsequent institutionalisation of IPRs protection in the TRIPS. In a crucial and controversial provision in the TRIPS, signatory countries become obliged to extend IPRs protection to plant varieties. This brings the obligation to grant state-supported monopolies over the commercial distribution of scientifically engineered seeds. For the biotech industry, the institution of such protection through PBRs holds the prospect of high yields and encourages commercial breeders, who had usurped seed innovation from farmer's decades earlier, to make more investments 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 practices of reusing and trading seeds collected from their own fields, strips off their comparative advantage in reproducing seeds and thus poses a threat to their traditional way of life: traditional varieties are pushed aside in favour of the purchasing of new seeds for every crop.⁵⁷ Many are also concerned about the implications arising from shifting agricultural research from public to private funding, which is often dominated by MNCs.⁵⁸

A. TRIPS Agreement and PGRs: Fostering Commercialisation

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

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

⁵⁷ Philip M Nicols, 'Trade without Values' (1996) 90 *Northwestern University Law Review* 658.

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.

Indeed, the commercialisation of PGRs contributes to a shift away from local farmer-centred agricultural practices to ones that are mediated heavily by corporate (often foreign) profiteering interests. The corporate control in 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 operation 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 to those that serve corporate interests, are seen to raise the price of patented seeds compared to other seeds, thus impacting food security.⁶²

B. TRIPS Agreement and PGRs: Stripping off Comparative Advantage

In comparison with most fields of industrial innovation, innovation in plant breeding results in a self-reproducing organism. For this biological factor, 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 industrialised and developing countries (e.g. the US, Europe, China, India, Brazil, Thailand and others) dramatically increase agricultural production of cash crops such as soybeans, peas, cereals and corn.⁶³ In addition, developing and least developed countries use such agricultural comparative advantage freely in order to reduce staple food prices.⁶⁴ IPRs that are introduced in PGRs through the TRIPS is likely to dismantle the comparative advantage and force farmers to repurchase seeds every year by enforcing contracts with farmers, many of which prohibit them from saving seeds and selling them to other producers.⁶⁵

In Bangladesh, the PVP, as projected in the draft Plant Variety Act, is supposed to ensure 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 high prices in foods, seeds, agricultural chemicals,

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.

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.

herbicides and other agro-products made of patented biotechnology, as is the case in developing countries such as India and Thailand that are already the TRIPS compliant.⁶⁶

C. TRIPS Agreement and PGRs: Creation of Private Monopoly Rights

By applying IPRs in PGRs, the TRIPS protects the interests of private capital. However, this turns genetic resources into private property leading to monopolies. Such privatisation of PGRs produces environmental and social consequences including insecurity of food because the process of commercialisation 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 following privatisation and monopolisation of genetic resources threaten the principle of free exchange of seeds, which is essential for the development of agriculture and the creation of plant genetic diversity. This process is often criticised as bio-piracy, which not only signifies a problem of illegal appropriation but also of the monopolisation of resources through IPRs protection.⁶⁸

With the Patents and Designs Act in force in Bangladesh, biotechnological products or processes receive coverage for patent protection, 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, as affected by the US-Bangladesh and the EU-Bangladesh bilateral treaties. All such requirements are heading towards making genetic resources private properties in Bangladesh, which means that food-stuffs, seeds, agricultural chemicals, herbicides and other agro-products made of biotechnology, are likely to be in private hands, especially in MNCs through patents or other IPRs. This would encourage MNCs to take the opportunity to monopolise market with higher prices for vital products including food stuffs.⁶⁹

D. TRIPS Agreement and PGRs: Shifting Public Funded Research to Private Fund

Before the TRIPS, most new plant varieties in openly pollinated plants were developed by publicly funded research programs or institutes, commercialised on a concessionary basis and often given to farmers at

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

⁶⁷ Plahe, above n 13, 1197–1198.

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.

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

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, the government's role of promoting agricultural research and supplying seeds at nominal costs is being scaled back.⁷² Now, agriculture in developing and least developed countries loses government subsidies or other benefits directly paid to the farmers. In addition, those government agencies involved with agricultural research concentrate on biotechnology and are now in the process of patenting plant genetic materials as well as seeds. Such cutting of subsidies and patenting of PGRs are likely to have adverse effects on food security.⁷³

Furthermore, the concentration on the biotech industry appears as a serious competition issue.⁷⁴ This is because food security falls at risk due to the fact that 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 the farmers for centuries. Hence, in common with other LDCs, Bangladesh concentrates on agriculture and offers agricultural subsidies, even from the foreign aid that forms a substantial part of the national budget.⁷⁶ However, currently the donors do not encourage the country to spend money in agriculture, which is likely to implicate food security.

E. TRIPS Agreement and PGRs: Misbalancing Bio-diversity

In order to maximise profits, the TRIPS also patrons seed companies to develop bio-engineered varieties dependent upon agrochemicals, including fertilisers, herbicides and insecticides and induces farmers to buy such inputs and pay heavy royalties to MNCs and various taxes include value added tax (VAT) to the government.⁷⁷ In addition, in order to secure private rights, the TRIPS encourages monocropping, which creates the possibility of epidemics, because genetically uniform crops are very vulnerable to diseases. Perhaps the most striking example is the corn blight which

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, above n 37, 97.

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.

⁷⁷ Lea, above n 65, 37.

struck the US 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 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, with the sector shifting in agricultural biotechnology research, and the rise and expansion of IPRs in PGRs, there has been a redirection of research. This redirection of agricultural R&D has focused on crops that will earn high profits, with concomitant neglect of unprofitable subsistence crops.⁸⁰ Further, the shift from agricultural to industry research edges out increasing numbers of subsistence farmers, who had relied on seed-saving and maintained and developed farmer landraces. This results in the rapid disappearance of in-situ genetic conservation methods and related farming knowledge.⁸¹

F. TRIPS Agreement and PGRs: Access to and Benefit Sharing of PGRs

The recognition of farmers' rights in different international instruments including CBD has formed the basis of the efforts to facilitate farmers' access to and benefit sharing PGRs as monetary and non-monetary benefits in the ways of access fees, up-front payments, royalties, licence fees etc. However, the TRIPS though adopted later does not make any reference to the CBD. Agriculture-prone developing countries have started inserting the access to benefit sharing provision in most biodiversity legislations. In Bangladesh, the access to benefit sharing is proposed in the draft Plant Variety Act and the draft Biodiversity Act.⁸²

New Strategies Needed

In the development of national and international frameworks for plant variety innovations, policy-makers need to be aware of the diverse perspectives that surround the use and breeding of plants.⁸³ With this background in mind, a better framework in the context of LDCs such as Bangladesh requires (A) reasonable national regulatory systems, and (B) affiliation with international coalition to exert pressure to ensure that

⁷⁸ R Kennedy, 'International Conflicts over Plant Genetic Resources: Future Developments' (2006) 20(1) *Tulane Environmental Law Journal* 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, above n 63, 192.

⁸¹ Maskus, above n 43, 715.

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

⁸³ Daniel Robinson, 'Sui Generis Plant Variety Protection Systems: Liability Rules and Non-UPOV Systems of Protection' (2008) 3(10) *Journal of Intellectual Property Law & Practice* 659, 664-665.

international agreements, including those concerned with trade, are made responsive to food security.

A. Framing National Regulatory Systems

As part of the formation of national regulatory systems, an LDC like Bangladesh is obliged to either introduce patents for new plant varieties or have an effective *sui generis* law to protect IPRs in PGRs by 1 July 2013. By that date Bangladesh must also bring the protection of trademarks, GIs and trade secrets up to the standards required by the TRIPS.

(I) Introducing Patents for New Plant Varieties with Redefining 'Invention'

To introduce patents for new plant varieties, the definition of the term 'invention' acts as a yardstick for identifying patentable products or processes. The TRIPS does not define the term 'invention' and leaves definition up to member countries. 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 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 gives a broad and vague definition of the term 'invention' meaning any manner of new manufacture and includes an improvement and an alleged invention.⁸⁸ By such definition, new plants or plant varieties are patentable inventions.

In order to get rid of the TRIPS implications, as Bangladesh is a least developed, agriculture-prone country, it has the first option to exclude plant varieties from patentable inventions and switch to *sui generis* PVP. As another option, Bangladesh can redefine 'invention'.

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, above n 51, 585.

⁸⁶ *Ibid.*

⁸⁷ *Ibid.*, 587.

⁸⁸ Patents and Designs Act Section 2(8).

Currently, the draft *Patent Law 2007* (draft Patent Act)⁸⁹ of Bangladesh is in much discussion. It does not exclude plant varieties from patentability but tries to redefine 'invention'. It defines the term 'invention' in imprecise and large words. It means and 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 of any of them, and an alleged invention.⁹⁰ However, the wording 'sufficiently inventive and useful improvement' is still capable of patenting all substances that exist in nature, with mere discovery or bio-prospecting.

(II) GIs

In Bangladesh there are many agricultural products and species with GIs. The products include plant varieties, medicinal plants or traditional knowledge (TK).⁹¹ IPRs protection in the name of GIs can 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 offer GI protection to its own GIs or those of trading partners on the basis of reciprocity. It may also be possible for the holders of TK in goods produced and sold using GIs to register and protect their TK under such law. India enacts such an Act in the name of the *Geographical Indication of Goods (Registration and Protection) Act, 1999* in order to give the higher level of absolute protection to GIs irrespective of origin.⁹²

(III) Trade Secrets

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

(IV) PVP (PBRs)

IPRs regimes such as PVP are established to help achieving societal goals. Policymakers in LDCs like Bangladesh should therefore view PVP as a tool

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.

to be adapted and used for achieving national agricultural development goals rather than an obligation imposed by industrialised countries.⁹³

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

However, the draft Plant Variety Act of Bangladesh that strengthens PBRs and thus expects to promote trade in Bangladesh does not define farmers as breeders. The sidelining of farmers through over-protection would affect trade and could lead to food security issues in Bangladesh. Therefore, while strengthening PBRs, the incorporation of farmers as breeders would recognise farmers' preservation of traditional farming practices, farmers' innovations by selecting and maintaining of seeds, farmers' traditional conservation of biodiversity and farmers' access to benefit sharing, thus meeting national priorities in agriculture-prone Bangladesh. This would also balance the interests of the variety of actors (especially commercial breeders and farmers) involved in agricultural trade. For example, such strategy brings harmony with the interests of commercial breeders and farmers in India and Thailand, as they start promoting 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, with insertion of provisions therein to regulate the sale, import and export of seeds, as the TRIPS does not require governments to regulate seed trade. However, in making the review, the existing seeds framework needs to be harmonised with the draft Plant Variety Act and the Biodiversity Act. This will stop any compromise in the rights of farmers to save, re-sow or exchange seeds. This will also stop the registration and sale of an existing variety or a farmers' variety, or the authority to issue compulsory licensing to control price and regulate supply of seeds under public interest conditions.

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

⁹⁴ Cullet, above n 37, 117–122.

⁹⁵ See Srividhya Ragavan and Jamie Mayer O'shields, 'Genetic Use Restriction Technologies: Do the Potential Environmental Harms Outweigh the Economic Benefits?' (2007) 20 *Georgetown International Environmental Law Review* 97.

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

(V) Limiting Patents and PBRs through Compulsory Licensing

Limiting patents and PBRs can act as an element to reduce and minimise food and livelihood security concerns in an LDC like Bangladesh. The limitation on patents and PBRs can be imposed through compulsory licensing. The draft can introduce opportunities for compulsory licensing of patents and PBRs 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 sale thereof is overpriced.

(VI) Access to and Benefit Sharing of PGRs

Access to and benefit sharing of PGRs are the key elements in meeting major food and livelihood security concerns in an LDC like Bangladesh. To this end, farmers should be allowed to choose from and have access to a wide range of germplasm and samples that would be best suited to their present needs. They should also have the right to use their own seeds. They should be free to improve germplasm (varieties and breeds) by using their own materials and those introduced from other sources. Farming communities should be free to sell the harvested commodity, to save seed (on 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 that could either prevent the PGRs from bio-piracy or removal from the country by local agents in the name of local access, or prevent privatisation by foreigners for profiteering purposes. It could also allow dissemination at the lowest possible cost to all farmers if the bio-pirated variety is of a staple food crop.⁹⁷

B. Ratchetting up International Coalition

A sui generis plant variety protection system, as set out in the TRIPS, should not be developed in isolation. Given that plant varieties are only a subset of biological resources, all countries that are members of the WTO and the CBD should stand together and aim at drafting a single all-encompassing law which takes into account the requirements of the CBD and the TRIPS that recognise farmers as breeders and ensure their rights.

Concluding Remarks

IPRs in PGRs transform agricultural goods or services from common heritage to private property on making their uses restrictive. As a consequence, in order to secure the investment of private individuals, IPRs in PGRs bring hardships to the masses in developing countries and LDCs by raising the prices of agricultural products in the guise of patent

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

monopoly, and pushing farmers into dependence on engineered seeds and other agricultural inputs. All of these instances are all the way linked to cause the access to food unsecured. Nevertheless, the TRIPS hold some exceptions and flexibilities to the general rule of trade. These include the discretion to redefine patentable inventions, to choose between patents and PBRs and to provide for compulsory licensing. This study recommends that Bangladesh stands in line with other LDCs with a view to making sure the TRIPS review favours the agricultural needs of LDCs. It also urges LDCs such as Bangladesh to take advantage of the TRIPS flexibilities in order to safeguard the food sector and to protect the rights of farmers. Such policy decisions not only affect economically poor farmers and the food sector in Bangladesh but also have the potential to influence IPRs policies in other LDCs. With this end in view, the study shows a clear need for public policy interventions to promote the utilisation and flow of PGRs. It also urges Bangladesh to frame legislation to suit the needs of development in agriculture, meet the TRIPS mandates and respect other commitments arising from the CBD and the ITPGRFA. This will promote farmers' rights, ultimately ensuring the access to food.