

Trends in Intellectual Property Research

Legal and Historical Perspective of Plant Breeders Rights Act of Pakistan

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Abstract: Pakistan is an agricultural country and numerous plant varieties have been developed indigenously by local scientists. There was a long felt need to introduce any sort of protection mechanism for these novel plant varieties to protect the research and development (R&D). Being a World Trade Organization (WTO) member, Pakistan acceded to the Trade-Related Aspects of Intellectual Property Rights (TRIPS) agreement in 1995, and since then, legislation was due to protect the rights of breeders of new plant varieties. In 2016, the Government of Pakistan passed the Plant Breeder's Rights Act (PBRA), in alignment with the International Union for the Protection of New Varieties of Plants Convention of 1991 (UPOV), balancing the interests of biotechnology companies and traditional plant breeders. The current study highlights Pakistan's strengths and areas that still require improvement to meet the nation's demands for plant variety protection.

Keywords: Intellectual Property; Pakistan; TRIPS; UPOV; Plant Variety; Plant Breeders Rights Act

1. Introduction

Pakistan's economy is primarily based on the agriculture industry. It makes up around 19.0% of the GDP, employs more than 40% of the labor force, and generates more than 50% of industrial production and more than 55% of export revenue. Protection of novel plant varieties is essential for the enhancement of crop yield and nutritional attributes and stability of the ecosystem. In this era of globalization, protection of intellectual property rights (IPRs) ensures the return of research and development (R&D) costs, secures the interests of investors, prevents biopiracy and discriminatory competition in the technology market (Gao, 2023). Without intellectual property (IP) protection, researchers and companies may experience challenges in further investments in R&D (Bamakan *et al.*, 2020). IPRs promote and support scientific advancements and creativity by ensuring that creators and inventors profit financially from their creations and have their contributions protected for a specific period of time (Liu, 2022). IPRs stimulate creativity, defend the rights of inventors and breeders, balance the interests of the public and the private sector, and foster the transfer and interchange of technological and cultural practices. These tenets serve as the foundation for the IP system. IPRs consist of trademarks, copyrights, patents, and geographical indications, each having a unique range of applications and functions for protection (Liu, 2009). IPRs benefit the researchers, and facilitate the lawful distribution and advancement of technology promoting society as a whole. Legal protection of plant varieties is necessary for keep running the innovation cycle. All sector of seed and plant industries cannot get benefit equally from every type of IPR. Type of IPR protection varies based on legal justifications and the biology of plants. On the same plant invention, it might be feasible to achieve multiple types of IPRs. The fundamental objective of IPRs include stimulating creativity, defending the rights of inventors, balancing the interests of the private and the public sector, and fostering the transfer and interchange of technological and cultural practices. These tenets serve as the foundation for the IP system and direct its application in the fields of law, business, and society. Current solutions combine

different techniques depending on a number of variables. Crop type, lawsuits, licenses, the research exemption, and deposits are some important factors to take into account while deciding type of IPR for plant variety protection. The present study discusses the current state of IP protection for plant varieties in Pakistan, and future challenges and opportunities.

2. History of PBRA

Being a World Trade Organization (WTO) member, Pakistan signed Trade-Related Aspects of Intellectual Property Rights (TRIPS) agreement in 1995. Article 27(3)(b) of the TRIPS Agreement, allows member countries protect plant varieties either by patents or by an effective *sui generis* system or by a combination thereof (WTO, 1994)¹. Pakistan revised its Patent Act of 1911 in 2000 to comply with the requirements of TRIPs Agreement, but there were no regulations related to plant variety in Pakistan Patent Ordinance of 2000. Hence the Plant Breeders' Rights Act, 2016 (PBRA) was passed on December 5, 2016. The plant variety as per PBRA 2016 is “a plant grouping within a single botanical taxonomy of the lowest known rank, which grouping, irrespective of whether the conditions for the grant of a new plant variety are fully met, may be (a) defined by the expression of the characteristics resulting from a given genotype or combination of genotypes; (b) distinguished from any other plant grouping by the expression of at least one of the said characteristics; and (c) considered as a unit with regard to its suitability of the plant grouping for being propagated unchanged” (Plant Breeders’ Rights Act 2016, No. 2(xxii) of 2016, The Gazette of Pakistan, 8 December 2016.²) which is in conformity with the definition in International Convention for the Protection of New Varieties of Plants of 2 December 1961 as Revised at Geneva on 10 November 1972, on 23 October 1978, and on 19 March 1991. (4)(Article 1(vi).) (UPOV) 1991³ (Peer, 2016). The new plant variety criteria of “novelty, distinctness, uniformity, stability and designated by an acceptable denomination” also follows the footsteps of UPOV. Nearly whole PBRA is in compliance with UPOV. But question is whether it will benefit Pakistan and if yes to how much extent. All members of the International Union for the Protection of New Varieties of Plants (UPOV’s) need to design plant variety protection (PVP) framework for by granting IPRs. Criteria for the grant of IPRs is based on the three conditions; variety must be distinct (D) from existing varieties, uniform (U) characteristics depending on the species' reproductive system, and stable (S) in trait expression after two independent growing cycles. The DUS test developed in 1991 of UPOV is the strategy used to determine distinctness, uniformity, and stability (Jordens, 2005). Hence a novel variety, who has passed the DUS test, and has a distinctive name can be submitted for PVP (Silva *et al.*, 2017).

Pakistan’s economy mainly relies on agriculture sector as nearly 50% of Pakistani are directly or indirectly employed in agriculture. According to Pakistan Bureau of Statistics (2018)⁴ Pakistan's GDP, is primarily derived from agriculture, which contributes approximately 24% of the country's economic output. The main cash crops of Pakistan are tobacco, wheat, cotton, rice, sugarcane, and maize. By implementing the PBRA, Pakistan is promoting the technology of genetically modified crops (GMO crops), which will improve seed quality and increase foreign private sector investment in the agriculture sector (Sial, 2016). The law will increase competition between breeders and seed producers. According to the Federal Minister of National

¹ WTO. (1994). Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS). https://www.wto.org/english/docs_e/legal_e/27-trips_01_e.htm

² <https://www.pbrr.gov.pk/Detail/ODI3OWE3NDAtN2EyMC00YjYyLTliM2UtNGU3MWM0Mjk4YjY4>

³ UPOV. International Convention for the Protection of New Varieties of Plants of December 2, 1961, as Revised at Geneva on November 10, 1972, on October 23, 1978, and on March 19, 1991. https://www.upov.int/edocs/pubdocs/en/upov_pub_221.pdf (accessed on 23 December 2023).

⁴ <https://www.pbs.gov.pk/content/agriculture-statistics>

Food Security and Research (2013–2017) Mr. Bosan, "the main objective of this legislation is to protect farmers' rights and provide farmers with high-quality seed" (Bokhari, 2016). The creation of new plant types benefits farmers and consumers in a number of ways. Some of the advantages for farmers are higher yield, resilience to pests and diseases, tolerance to stressors, increased input efficiency, enhanced crop quality and better harvest ability, and a wider range of options (Sanderson, 2013). The Seed Act (amended in 2015) and the Plant Breeders' Rights Act 2016, will unleash the use of genetically modified (GM) seeds. In Pakistan, the technology of genetically modified crops can resolve the global food insecurity and hunger issue. This new technology however comes at an elevated price. Local farmers will have to pay for the costly seeds, and purchase them every season, besides paying for the increased inputs these seeds require, like extensive irrigation and expensive fertilizers and pesticides, which are already known to have detrimental effects on the quality and soil's ability to produce. This act encourages the conservation and sustainable use and exchange of plant genetic resources by promoting the use of traditional varieties, and encouraging local communities to participate in the management of plant genetic resources. This act stipulates that in specific situations, e.g., when a national emergency or other extremely urgent situation arises, or when the plant breeder neglects to make the protected variety reasonably available to the public, Government of Pakistan can issue compulsory licenses. The act protects the rights of small-scale farmers allowing plant breeders to cultivate and distribute new, genetically modified seeds. PBRA protects both the expansion and advancement of traditional crops as well as the rights of farmers. It acknowledges farmer rights to store, use, trade, and sell seeds from varieties that are protected for their own purposes. Hence this act makes sure that farmers and researchers can still access protected varieties that the plant breeder are unable to supply them.

3. Perceived Benefits and Pitfalls of PBRA

Pakistan is a party to the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), which guarantees farmers' rights to preserve, utilize, trade, and market seeds they have conserved from their farms. WTO Members can "avoid the monopolization of plant genetic resources, including their parts and components, such as genes" (Correa, 2014). Pakistan Patent Ordinance 2000, under section (U/S)7(4)(b), excludes patent protection for "plants and animals other than micro-organisms, and essentially biological processes for the production of plants or animals other than non-biological and microbiological processes" (Patents (Amendment) Ordinance 2016. *The Gazette of Pakistan*. Ord. No 17 of 2016, A1725) (Sial, 2016). PBRA 2016 requires disclosure of origin and access-benefit sharing requirements which is not in harmony with UPOV. Green Revolution of 1960's in Pakistan was possible only due to no IPR regime (Rehman & Mubeen, 2017).

Farmers used to save and trade seeds, but corporations focus on creating and marketing plants and seeds. Although it makes up a small percentage of operating costs, this is crucial to the farming operation's performance. Most farmers in Pakistan obtain seeds through ancient and customary practice of preserving, using, trading, and selling farm-saved seeds, which is regarded as the foundation of the country's agricultural system. Section 22 of PBRA prohibits the protected seed types from being conditioned or multiplied, nor can they be offered for sale, sold, marketed, imported, or exported. As per section 38, the breeder can file a civil lawsuit against violation of those rights. This protection term is 25 years for trees and wines and 20 years for all other plants as per section 24. By controlling low-quality seeds and developing a strong seed industry in Pakistan, the act seeks to guarantee farmers' access to high-quality seeds and planting materials (Peer, 2016). Nearly all PBRA sections incentivize plant breeders and seed organizations in the public and private sectors to invest in plant breeding research and engage in healthy competition for the development of seed varieties.

The official seed market in Pakistan is made up of both public and private sector organizations and companies engaged in a range of seed-related activities, including authorized seed variety distribution, multiplication, and research and development of new varieties. Public sector seed corporations include mainly Punjab and Sindh Seed Corporations, regulatory bodies such as the Federal Seed Certification and Registration Board (FSC&RD), Pakistan Central Cotton Committee (PCCC), research organizations like the Pakistan Agriculture Search Council (PARC) and National Biosafety Committee (NBC), whereas, private seed companies, and input dealers are thus the main players in Pakistan's formal seed industry. Pakistan registered its first seed corporation in 1981 (Rehman & Mubeen, 2017). Various federal and provisional research institutes conduct research to generate high-yielding seed varieties. Pakistan Central Cotton Committee (PCCC), Pakistan Agricultural Research Council (PARC), and research institutes of Pakistan Atomic Energy Commission (PAEC) are the principal federal agricultural research centers. Ayub Agricultural Research Institution (AARI) and University of Agriculture, Faisalabad (UAF) are also playing an important role in plant breeding and the creation of novel seed types at the provincial level. Public sector work on seed development has been surpassed by private sector institutions due to growing financial and management challenges in the former. Private sector provides a significant portion of the seed needed for the rice, maize, and cotton crops. Local seed production and distribution dominate the businesses, with a minimal presence of multinational corporations. Four international corporations namely Bayer, ICI, Pioneer, and Syngenta began doing so in the 1990s, while Monsanto began its operations in 1984. These multinational corporations have played a crucial role in the dissemination of hybrid seeds. The hybrid seeds of sorghum and maize were introduced by Pioneer and Monsanto, while ICI introduced the hybrid seeds of canola. In the 1990s, Pioneer and Monsanto invested in the creation of high-yielding seeds for the important crops of wheat, cotton, and rice; however, but withdrew because of concerns over germplasm safety (Jafri *et al.*, 2022).

The Seed Act 1976 laid foundations of seed quality regulation, certification and registration of crop varieties. The preamble of this act states its objective as "controlling and regulating the quality of seeds of various varieties of crops." The private seed sector in Pakistan has expanded following the 1976 modification of the Seed Act. In the last decade, several well-known international corporations started business in Pakistan, including Pioneer Pakistan Seed Limited, a division of Pioneer Hi-Bred International, USA. Private seed company registrations quickened after 1990, and in Pakistan, the seed industry was officially recognized as an industry in 1994 (Rana, 2014). Total 291 private seed companies were registered between 1990 and 2000, according to the Federal Seed Certification and Registration Department (FSC&RD), the main organization in Pakistan in charge of seed arranging (Rehman & Mubeen, 2017). Approximately 1051 public and private seed organizations had registered in Pakistan up to January 2016 according to FSC&RD sources (Rehman and Mubeen, 2017). Monsanto Pakistan Agritech (Pvt.) Ltd. (1984), Bayer Crop Sciences, Syngenta Pakistan Ltd. (1991), Pioneer Pakistan Seed Ltd. (1989) and ICI Pakistan Ltd. (1998) are the five major multinational seed companies functioning in Pakistan. These seed companies have formed several associations like All Pakistan Private Seed Association, the Seed Association of Pakistan, Chambers of Private Seed Industries, Seed Companies Association of Pakistan, All Pakistan Seed Merchants Trade Association and All Sindh Private Seed Companies (Rana, 2014). Of these seed companies, 82% are concentrated in Punjab. However informal seed sector in Pakistan contributes nearly 80% of the total seed requirement per annum (Rana 2014).

Plant breeder rights existed in 74 countries prior to the Act, with Pakistan being the exception. As a result, Pakistan's agricultural sector faced a decline in international investment. By offering an efficient seed variety protection system, PBRA will hopefully increase investments in this industry leading to improved yield, and eventually more exports. PBRA was well received since it helped Pakistan comply the requirements of the TRIPS Agreement, which were especially designed to safeguard plant breeders' rights to patent varieties. The PBRA's exclusive rights directly benefit major seed corporations. Multinational seed

companies' profit objectives are best served by IPRs, which allow corporations to force local breeders out of the commercial market (Bokhari, 2016). Research indicates that international seed companies frequently "create new genetically modified plant varieties that they can declare as their 'invention' and subsequently patent" by utilizing indigenous gene pools (Yazdani & Ali, 2017).

The Food and Agriculture Organization (FAO)⁵ claimed that Pakistan's agricultural output has significantly increased due to the introduction of new plant species. Pakistan's agricultural exports increased from \$4.4 billion in 2015–16 to \$5.8 billion in 2020–21, as reported by the Pakistan Bureau of Statistics. This increase in value was partially attributed to the introduction of new and enhanced plant varieties, which increased the competitiveness of Pakistani agricultural products in the international market. For example, a new wheat variety named "Pakhtunkhwa-2013" improved yield by 35%. According to a report published by the Asian Farmers' Association for Sustainable Rural Development (AFA), act may have certain disadvantages. Farmers' rights to conserve, use, exchange, and sell seeds from protected types are restricted under this act. Similarly, since buying seeds from legally protected plant breeders can be expensive, small farmers may find it challenging to obtain improved seed types.

4. Pakistan's Seed Industry and Politics

The gap between Pakistan's small-scale farmers and large farm owners, as well as between landowners and tenants, was due to the unequal division of land following partition and the legacy of a feudal system formed by British colonialism. Just 5% of Pakistan's major landholders are said to own 64% of the country's farmland, whereas, 65% of small-scale farmers only own 15% (Nazeer, 2015). Ninety percent of the rice-growing land in Pakistan and Peninsular Malaysia was by just five "super varieties" by the early 1990s (Kuyek 2001). Offering subsidies helped convince Pakistan's large farmers and landlords to utilize hybrid seeds in addition to their pricey inputs of chemical fertilizer, pesticides, machinery, and the hybrid seed itself (Sadeque, 2014). These hybrid varieties soon replaced local seeds, which finally vanished. By the middle of the 1970s, Pakistan's large farmers had become so accustomed to the technology that they had forgotten about the old ways. A seed bill that "would give preferential treatment to the commercial seed industry, local or foreign, discouraging farm-saved seed, and depriving women seed-savers of their traditional work" was therefore well-timed to be introduced in 1976 (Sadeque, 2014). When Pakistan joined the World Trade Organization (WTO) in 1995 and was required to ratify the Trade Related Aspects of Intellectual Property (TRIPS) Agreement, the country's preference for corporate agribusiness was accentuated. By prohibiting any other party from making money off of the commercial use of the variety, this agreement effectively granted the owner rights over a novel seed variety or genetic material.

5. Pakistan with India Legislation

Pakistan's seed sector is regulated by the Seed Act, 1976. The main purpose of the Seed Act is to manage and quantify the nature of seed varieties of agriculture sector (Pakdoc, 2012)⁶. India also adapted various features of laws of other nations and incorporated them within its own Act (Ramanna, 2003). Indian government approved the PPV & FR Act of 2001. In 1994 India drafted a law after joining the TRIPs agreement (Brahmi *et al.*, 2004). Article 27.3(b) of TRIPs stated that the signatory nations will preserve the plant varieties by an efficient sui generis system, patents, or a combination of both (Ranjan, 2009).

PBRA will encourage seed companies and plant breeders in the public and private sectors to invest in plant breeding and research. The act will help get protection for foreign varieties, new technologies, and the

⁵ <https://www.fao.org/3/CA3129EN/CA3129EN.pdf>

⁶ PakDocs. (2012). Seed Act 1976: The main Objective of Seed Act 1976 (Pakistan). Retrieved from: <http://www.pakdocs.com/seed-act-1976>.

development of superior varieties. It will promote and foster healthy competition for variety development among public and private sector organizations. Three types of rights are provided by the PPV&FR Act: (i) Breeders' Rights, which grant special permission to sell, produce, market, distribute, export, or import seed of the protected variety; (ii) Researchers' Right to use the variety as a starting point for developing a developed variety; and (iii) Act acknowledges that farmers' rights as breeders' rights. However, section 22 of the PBR Act grants plant breeders the exclusive right to sell or offer for sale the protected variety or developed variety in Pakistan, as well as to import or export the saved variety's generative or vegetative propagating material into or out of Pakistan, among other things (PBR Act, 2016)⁷. According to Section 25(d) of the Act, farmers are free to use, save, exchange, sow, re-sow, share, or sell the seeds from their farm production; however, under the terms of the Seed Act, 1976 (XXIX of 1976) (Pak Doc, 2012)⁸, and its regulations, farmers are not allowed to sell seed of a variety that is protected (PBRA 2016, s25) on a commercial basis. In summary, Pakistani farmers have less rights under the PBR Act than under the Indian Act (Mubeen, & Rehman, 2022).

6. Conclusions

An important part of Pakistan's national economy is agriculture. The PBRA 2016 aims to protect the interest of breeders, seed organizations, producers and farmers by providing a framework for the protection of plant varieties and farmer rights. Pakistan has signed international agreements such as ITPGRF, TRIPS agreement and the Convention on Biological Diversity (CBD) to protect plant species. The PPV&FR Act goes into greater depth about the rights of farmers compared to PBRA. Individuals can file a lawsuit in district court. If they believe their rights have been violated with options for appeal through tribunals and high courts however, there are other legal avenues available, including tribunals and high courts. The PBRA 2016 does not attempt to blend elements of the UPOV system with the ITPGRFA, CBD, and CPB's guiding principles. Pakistan should utilize the flexibility provided by TRIPS to align with national interests, agricultural practices, and conflicting commitments. A comprehensive strategy considering Pakistan's obligations under TRIPS, CPB, CBD, and ITPGRFA could protect plant breeders' rights without compromising Pakistan's agricultural interests.

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⁸ PakDocs. (2012). Seed Act 1976: The main Objective of Seed Act 1976 (Pakistan). Retrieved from: <http://www.pakdocs.com/seed-act-1976>.

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