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“THE ROLE OF INTELLECTUAL PROPERTY IN AGRICULTURAL INNOVATION: A STUDY OF PATENTS AND PLANT VARIETY PROTECTION SYSTEM”

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ABSTRACT

Agricultural innovation is a cornerstone of global food security, rural development, and environmental sustainability. With the challenges of a growing global population, climate change, and depleting natural resources, the agricultural sector must continuously evolve through the development of improved crop varieties, sustainable farming practices, and advanced biotechnological interventions. Intellectual Property Rights (IPRs) have emerged as a key driver in this transformation by providing legal mechanisms to protect and reward innovation. Among the various forms of IPRs, patents and Plant Variety Protection (PVP) systems are particularly significant in the context of agriculture.

Patents, which offer exclusive rights over new inventions, have been used to protect biotechnological advancements such as genetically modified crops and pest-resistant plant strains. However, the scope and ethical implications of patenting life forms remain highly debated, especially in relation to access, affordability, and the rights of traditional knowledge holders. On the other hand, sui generis PVP systems have been developed to offer breeders a form of protection that is more tailored to the unique nature of plant varieties, while also accommodating the practices and rights of farmers.

This paper delves into the role of IPRs in fostering agricultural innovation, focusing on how patents and PVP systems stimulate investment in research and development, facilitate the transfer of technology, and promote the commercialization of improved plant varieties. It further examines the international legal framework under the TRIPS Agreement and the UPOV Convention, and evaluates India's legislative response through the Protection of Plant Varieties and Farmers' Rights (PPVFR) Act, 2001. India's sui generis system is notable for attempting to strike a balance between the interests of commercial plant breeders and the

traditional rights of farmers, who have historically played a crucial role in conserving and developing plant genetic resources.

By analyzing the benefits and challenges of implementing IPRs in agriculture, this study aims to provide a comprehensive understanding of how legal protection mechanisms can contribute to agricultural advancement while ensuring equity, accessibility, and sustainability. The paper also reflects on the broader implications of IPRs for food sovereignty, biodiversity, and innovation in the Global South.

INTRODUCTION

Globalisation has significantly contributed to the emergence of a knowledge-based economy, wherein intellectual property rights (IPRs) have become one of the central drivers of innovation. Traditionally, agricultural practices and knowledge were treated as community-owned resources, shared and passed down through generations without formal claims to exclusivity. However, the last few decades have witnessed a remarkable transformation, with substantial advancements in agricultural technologies and the parallel evolution of IPR frameworks governing them.

In India, the Green Revolution marked a pivotal phase by ensuring self-sufficiency in cereal production and achieving food security. Yet, the broader adoption and integration of agro-technological innovations into the socio-economic fabric of Indian agriculture has encountered numerous challenges. As the country grapples with rising population and accelerating economic development, the demand for both the quantity and quality of food production is intensifying.¹ Addressing these demands necessitates robust agricultural practices, alongside efficient distribution mechanisms and innovative approaches that engage multiple stakeholders.²

Over the past two decades, intellectual property protections have progressively expanded to encompass diverse agricultural knowledge systems, biological materials, and agro-based products. The evolving nature of IPRs, particularly in the context of patentability of living organisms such as plants, animals, and microorganisms, has led to significant legislative

¹ M.S. Swaminathan, 'Sustainable Food Security' (2000) 3 *Indian Journal of Agricultural Economics* 153.

² S. Rajagopal, 'Modernising Indian Agriculture: Issues and Challenges' (2018) 64(4) *EPW* 42.

transformations across various jurisdictions. Ethical considerations, coupled with legal uncertainties—particularly regarding the recognition of farmers’ rights—pose substantial challenges to agricultural development and global food security. Moreover, the drive towards commercialization and industrialization continues to exert considerable pressure on agrobiodiversity.

Given the dynamic nature of the global agricultural economy, it is imperative to develop legal mechanisms that effectively address the concerns of plant breeders, cultivators, and other relevant actors. Ensuring intellectual property protection for plant innovations—including new varieties, existing strains, or essentially derived varieties—remains a critical yet complex task. Several areas remain under-addressed, either due to legislative unpredictability or a lack of consensus on fundamental issues such as the scope of protection and the nature of rights to be granted.³

PLANT PROTECTION UNDER INTELLECTUAL PROPERTY RIGHTS

Historically, plants and related agricultural innovations were excluded from the purview of patent protection under early patent regimes. Patent laws, which began to emerge in several countries as early as the nineteenth century, offered protection to a limited category of inventions that fulfilled specific legal standards.⁴ During the period between 1790 and 1970, plant-based inventions were typically denied patent protection on the grounds that they did not meet the fundamental criteria of patentability.² According to conventional patent law, an invention must satisfy the following three prerequisites to be eligible for protection: it must be novel, involve an inventive step (non-obviousness), and possess industrial applicability (utility).⁵

All patent grants confer upon the patentee the exclusive right to prevent third parties from manufacturing, using, or commercialising the protected invention. However, to maintain the balance between innovation and public interest, patent laws require full disclosure of the

³ N.S. Gopalakrishnan and T.G. Agitha, ‘Protection of Plant Varieties and Farmers’ Rights in India: Law and Policy’ (2003) 8 *Journal of World Intellectual Property* 389.

⁴ R. Venkataraman, *Intellectual Property and Agriculture: Issues and Strategies* (Oxford University Press 2017) 91.

⁵ W.R. Cornish, *Intellectual Property: Patents, Copyright, Trademarks and Allied Rights* (Sweet & Maxwell 2003) 262.

invention through detailed patent documentation. Despite this, plant-related inventions in jurisdictions such as the United States and Europe were long considered incapable of satisfying key legal requirements, such as inventive step, utility, and adequate disclosure.

In India, the Patents Act, 1970 laid the legislative foundation for intellectual property protection in various domains, including certain aspects of agriculture.⁶ Following amendments in 1999 and 2002, the scope of patentability was expanded modestly to include agricultural equipment, machinery, and processes related to agrochemicals.⁷ However, under Section 3 of the Act, methods of agriculture and horticulture, as well as biological materials such as plant varieties, seeds, breeds of animals, and any related processes for enhancing their value or disease resistance, remained excluded from patentable subject matter.⁸ Consequently, while certain technical inventions in the field of agriculture—such as growth regulators, biogas technologies, or food processing innovations—may qualify for patent protection, biological entities like plants and plant varieties do not fall within the ambit of the Indian patent regime.⁹

The Indian framework did not initially recognise the rights of farmers or provide legal protection to new plant varieties. In contrast, many countries developed *sui generis* systems to grant plant breeders' rights (PBRs), designed to acknowledge and incentivise achievements in conventional plant breeding. These rights, though more limited than patents, allow right holders to prohibit others from commercially exploiting protected plant varieties. Because PBRs apply to subject matter with lower distinctiveness and do not require the same level of novelty or inventive step as patents, the standards for granting protection are comparatively less stringent.¹⁰

Despite offering a weaker form of protection, the PBR regime has served as a significant stimulus for commercial breeding efforts. In developing countries, such breeding programmes have historically been driven by public sector institutions or supported by international research collaborations.¹¹

⁶ The Patents Act 1970 (Act 39 of 1970).

⁷ The Patents (Amendment) Act 1999 and The Patents (Amendment) Act 2002.

⁸ The Patents Act 1970, s 3(h)-(j).

⁹ B. Dasgupta and S. Jain, 'Patent Law and Agricultural Innovations in India' (2014) 19 *Journal of Intellectual Property Rights* 134.

¹⁰ N.S. Gopalakrishnan and T.G. Agitha, *Principles of Intellectual Property* (Eastern Book Company 2009) 201.

¹¹ Suman Sahai, 'The Protection of Plant Varieties and Farmers' Rights Act, 2001: A Critique' (2003) 38(30) *EPW* 313.

PLANT VARIETY PROTECTION: HISTORY OF PLANT BREEDING

Prior to the advent of modern agricultural technology, innovations in the development or propagation of new plant varieties were generally regarded as natural outcomes of evolutionary processes and were not considered eligible for patent or intellectual property protection. The notion of safeguarding plant varieties through legal rights is a relatively recent development, emerging in response to the increasing commercialisation of agricultural biotechnology.

Innovation in biotechnology, particularly in plant breeding, necessitates substantial financial investment. However, once a novel plant variety is commercialised, its benefits can be easily replicated by others, often without compensating the original innovator. In the absence of a legal framework providing adequate protection and potential economic incentives, commercial entities are likely to be disinclined to invest in the development of new plant varieties. Historically, before the formalisation of scientific plant breeding in the seventeenth century, the crops cultivated by farmers were the product of millennia of both conscious and unconscious selection processes.¹²

Farmers have long contributed to agricultural innovation by developing new plant varieties through necessity—seeking greater resilience to disease, higher yields, or improved physical attributes of crops. Such efforts, rooted in empirical knowledge and experience, were traditionally seen as contributions to the public good rather than innovations eligible for private gain.¹³ Consequently, there has been resistance—especially in developing countries—to extending intellectual property protection to plant varieties, premised on the belief that such biological innovations are part of the common heritage of mankind.²⁰ At the same time, advocates of plant variety protection, including investors and breeders, have increasingly called for recognition of their contributions through breeders' and farmers' rights.²¹

It was during the seventeenth century that some forward-looking agriculturalists began to realise that systematic selection of plants could result in substantial improvements, thereby laying the foundation for the plant breeding industry. The rediscovery of Mendel's laws of inheritance in the early twentieth century provided a scientific basis for plant breeding,

¹² P. Kooij and J. Wit, 'Agricultural Biodiversity and Intellectual Property Rights: The Challenge for Development Policy' (Oxfam GB, 2001) 11.

¹³ Suman Sahai, 'The Protection of Plant Varieties and Farmers' Rights Act, 2001: A Critique' (2003) 38(30) *EPW* 313.

facilitating the deliberate generation of genetic variation within species. Through this variation, plant breeders select superior traits to develop new and improved plant varieties.¹⁴

The creation of a superior plant variety represents one of the most complex and demanding tasks in agricultural science. This process involves manipulating a vast array of interacting genes, each influencing different traits of the plant. Moreover, to ensure stability and adaptability, candidate varieties must be tested across multiple seasons and diverse agro-climatic conditions. Consequently, the development of a commercially viable plant variety is both time-consuming and capital-intensive.¹⁵

NEED FOR PLANT VARIETY PROTECTION

The global agricultural landscape underwent significant transformation in the aftermath of World War II, as widespread crop losses created a pressing need for increased agricultural productivity. This necessity led to remarkable advancements in agricultural technologies. Innovators, including individuals possessing indigenous and traditional knowledge, sought to safeguard their contributions and interests during this period of transformation. Consequently, legal frameworks were developed to protect the rights of plant breeders, innovators, and traditional knowledge holders.¹⁶

Granting patent protection to certain plant varieties served multiple objectives—improving agricultural quality, incentivizing innovation among researchers, and facilitating the development of novel products such as pest-resistant crops. The overarching goal of intellectual property rights (IPR) regimes is to foster scientific progress by ensuring temporary exclusive rights to inventors over their discoveries, thereby encouraging continuous creativity and innovation.

Plant varieties are developed through years of selective breeding, focusing on traits that result in better yields, improved quality, and enhanced resistance to various stressors. The development of high-performing plant varieties relies on advanced plant breeding technologies,

¹⁴ D. J. Murphy, *Plant Breeding and Biotechnology: Societal Context and the Future of Agriculture* (Cambridge University Press 2007) 23.

¹⁵ M. Goodman, 'Plant Breeding Requirements for Intellectual Property Protection' (1995) 10 *Journal of Agricultural and Environmental Ethics* 34.

¹⁶R. V. Anuradha, "Plant Variety Protection and Farmers' Rights in India: Law and Policy", 45 *Journal of Intellectual Property Rights* 56 (2020).

which are integral to increased agricultural productivity across different regions of the world. These improved varieties have significantly contributed to higher farm incomes and broader economic development.¹⁷ Given that plant breeding is both time-intensive and capital-intensive, breeders are unlikely to sustain their efforts in the absence of reasonable economic incentives. Hence, the establishment of an effective system for the protection of plant varieties is crucial. Such a system ensures that plant breeders receive equitable rewards for their labor, investments, and innovation, while also protecting their creations from unauthorized use.¹⁸

The challenge in protecting plant varieties under conventional patent law stemmed from their inability to meet specific legal criteria, leading to the emergence of a sui generis system tailored to the unique attributes of plant varieties and the needs of breeders, farmers, and commercial stakeholders.¹⁹ The implementation of IPRs in the agricultural sector was envisaged to stimulate private sector investment, foster technology transfer, and ultimately promote agricultural development and increased food production. By encouraging innovation and facilitating its dissemination, IPRs play a pivotal role in ensuring that technological advancements become accessible to the wider industry and the public, particularly during the period when the protected innovation is disclosed.²⁰

PATENTS IN AGRICULTURAL INNOVATION

Patents have emerged as a central tool in incentivizing research and development (R&D) in agricultural biotechnology. By granting exclusive rights for a fixed term—generally 20 years under the TRIPS Agreement—patents allow inventors to prevent others from making, using, or selling their inventions without permission. This form of legal protection provides a commercial reward for innovation, encouraging both public and private sector entities to invest in the high-risk, capital-intensive field of agricultural innovation.

A landmark moment in the history of agricultural patents was the U.S. Supreme Court's decision in *Diamond v. Chakrabarty*,²¹ where a genetically engineered bacterium capable of breaking down crude oil was held to be patentable under U.S. law. The Court ruled that

¹⁷ J. Kesan and A. Gallo, "Property Rights and Incentives in the Agricultural Biotechnology Innovation System", 50 *Iowa Law Review* 461 (2012).

¹⁸ UPOV, "Overview of the UPOV Convention", available at <https://www.upov.int> (last visited Apr. 20, 2025).

¹⁹ S. Srinivas, "Sui Generis Protection of Plant Varieties: A Critical Review of the Indian Law", 7 *Indian Journal of Law and Technology* 32 (2011).

²⁰ Carlos M. Correa, *Intellectual Property Rights, the WTO and Developing Countries* 89 (Zed Books, 2000).

²¹ *Diamond v. Chakrabarty*, 447 U.S. 303 (1980).

“anything under the sun that is made by man” could be patented, thus opening the door for genetically modified organisms (GMOs), including crops, to be protected as intellectual property.²² Following this judgment, a surge in patents was witnessed for various agri-biotech innovations, such as:

- Genetically modified (GM) seeds with traits like herbicide tolerance and pest resistance (e.g., Bt cotton and glyphosate-resistant soybeans).
- Plant tissue culture techniques for clonal propagation of elite cultivars.
- Gene-editing methods, including CRISPR-Cas9 applications in plant breeding.
- Transgenic plants engineered to withstand abiotic stress such as drought or salinity.²³

These patents have enabled multinational corporations to dominate the seed industry and shape global agricultural practices. However, the growing trend of privatizing biological resources through patents has been met with criticism on ethical, legal, and socio-economic grounds.

Critics argue that such patents create artificial monopolies over essential resources like seeds, which traditionally were considered part of the commons. Patents often include 'no replant' clauses or technology use agreements, which restrict farmers from saving or exchanging seeds—an age-old practice central to traditional farming systems, especially in developing countries. This has led to increased dependency on commercial seed companies, marginalizing smallholder farmers and potentially compromising food sovereignty.

Another key issue relates to the “product of nature” doctrine, a legal principle which holds that natural phenomena and products cannot be patented. This doctrine initially prevented the patenting of plant varieties and biological substances that had not been significantly altered from their natural state. However, courts later made a distinction between discovery and invention, holding that engineered or modified biological materials could be patentable if they involved a human intervention that resulted in a product not found in nature. For example, in *J.E.M. Ag Supply v. Pioneer Hi-Bred International*, the U.S. Supreme Court confirmed that utility patents could be granted for sexually reproduced plants, even when Plant Variety Protection certificates already covered them.²⁴

²² Garnett, K., *Intellectual Property*, 267 (5th edn., Pearson, 2021).

²³ Graff, G. D., Rausser, G. C., & Small, A. A., "Agricultural Biotechnology's Complementary Intellectual Assets", *85 Review of Economics and Statistics* 349, 352 (2003).

²⁴ *J.E.M. Ag Supply, Inc. v. Pioneer Hi-Bred International, Inc.*, 534 U.S. 124 (2001).

The expansion of patentable subject matter to include living organisms and biological processes has raised serious bioethical concerns. Questions surrounding biopiracy, benefit-sharing, and the commodification of life forms remain central to the global debate over the appropriateness of patent regimes in agriculture. Moreover, many developing countries struggle to balance their obligations under international agreements such as the TRIPS Agreement with their socio-economic realities, including the rights of indigenous farmers and access to genetic resources.

Thus, while patents have undeniably spurred innovation in agricultural biotechnology, they also pose significant equity and access challenges. Crafting an inclusive and balanced intellectual property regime that supports innovation while safeguarding farmers' rights and public interest remains a critical goal.

MAJOR ARGUMENTS AGAINST PATENTING PLANTS AND THEIR VARIETIES

One of the primary objections to the patenting of plant varieties is based on the “product of nature” doctrine, which asserts that naturally occurring substances or organisms cannot be claimed as inventions. Opponents argue that plant breeders’ outputs, particularly those derived from traditional or selective breeding methods, do not meet the fundamental criteria for patentable subject matter. These outputs are seen as mere discoveries rather than human-made inventions.²⁵ For instance, in many European jurisdictions, plant products such as fruits, flowers, vegetables, and other naturally occurring commodities like marble and ivory are excluded from patentability because they are fundamentally considered the work of nature, with minimal human intervention.

Historically, both the United States and European countries refrained from granting patents for plants, upholding the principle that patent law should not reward discoveries of natural phenomena. It was argued that granting such protection would equate to patenting nature’s own capacities and could, in turn, impede scientific and agricultural development. Another ethical argument emerged from the perception that living organisms are morally inappropriate subjects of private ownership. As such, plant-related inventions were excluded not on grounds of lacking inventiveness, but because they inherently existed in nature. However, this line of

²⁵ Dutfield, Graham, *Intellectual Property Rights and the Life Science Industries*, 62 (2nd edn., Routledge, 2009).

reasoning was ultimately rejected by patent laws in countries like Belgium, Germany, and the Netherlands, which evolved to accommodate a broader interpretation of human innovation.

A further challenge to patenting plant varieties lies in satisfying the requirement of novelty. Critics claimed that plant varieties often fail the test of absolute novelty, especially when derived from pre-existing or widely used genetic material. Nevertheless, this argument did not hold strong in jurisdictions like the United States, Germany, or the Netherlands, where the threshold for novelty was interpreted with sufficient flexibility to accommodate innovations in plant breeding.²⁶

The issue of inventive step also arose frequently in debates over plant patentability. It was contended that conventional breeding methods lacked sufficient ingenuity and would be obvious to a person skilled in the field. However, this position was countered by emphasizing the significance of achieving new traits or unique effects through known breeding techniques, which may still fulfill the requirement of an inventive step.

Another significant objection relates to the lack of industrial applicability of plant varieties. It was argued that agricultural innovations—especially those involving living materials—do not always align with the traditional understanding of industrial processes. While products such as fertilizers, irrigation systems, and agricultural machinery clearly possess industrial utility and are patentable, plant varieties and breeding practices often fall outside this characterization. Nonetheless, others contended that excluding such vital agricultural outputs from patent protection would be irrational, given their commercial value and utility in modern farming.²⁷

In response to such challenges, the United States introduced the Plant Patent Act of 1930, establishing a distinct form of protection for asexually reproduced plants. Over time, the scope of protection expanded to include utility patents for sexually reproduced plants, thus creating a dual framework in the U.S.—the general Patent Act and the sui generis Plant Variety Protection Act.²⁸ While the implementation of the Utility Patent Act temporarily paused debates around plant patentability, they resurfaced in the late 1970s, culminating in legal clarity

²⁶ Choudhary, Bhagirath and Gaur, Kadambini, “Intellectual Property Rights for Agricultural Biotechnology in India: Addressing Innovation and Food Security,” 2 *Journal of Crop Improvement*, 24, 30 (2006).

²⁷ Mohan Dewan, IPR Protection in Agriculture: An Overview, *JOURNAL OF INTELLECTUAL PROPERTY RIGHTS* (April 20, 2025) <http://nopr.niscpr.res.in/>

²⁸ Id

with the judicial affirmation of plant patenting rights in 1985.²⁹

India addressed the complexities surrounding plant variety protection by enacting the Protection of Plant Varieties and Farmers' Rights Act, 2001, in line with obligations under the TRIPS Agreement. This legislation represents a sui generis approach, crafted to suit India's socio-economic context and the needs of its agrarian population. The Act is unique in offering statutory protection not just to breeders but also to farmers as innovators and conservers of biodiversity. It permits each nation under the sui generis system to impose appropriate limitations on breeders' rights to further agricultural research and safeguard the interests of traditional farming communities.

In sum, although traditional patent systems were initially resistant to recognizing plant varieties as eligible subject matter, the global framework has evolved to allow various forms of protection. Amidst continuing debates, India has successfully implemented an IPR regime that seeks to harmonize the interests of breeders, researchers, and farmers, contributing to an inclusive and balanced model for agricultural innovation.

BACKGROUND OF PROTECTION OF PLANT VARIETY AND FARMERS' RIGHTS ACT 2001 (PPVFR ACT)

The Indian government has been concerned with food security, agricultural research, and the production of new plant kinds since time immemorial. According to Article 27.3 (b) of the TRIPS Agreement, plant varieties can be protected through patents, a sui generis system, or a combination of the two.³⁰ By the year 2000, commercial breeders, farmers, and agro biodiversity conservationists, in particular, recognised the necessity for Plant variety Protection to promote food security. A sui generis framework for Plant variety Protection was essential for India to be able to both defend and safeguard its farmers' interests while also offering rights to plant breeders.³¹

The plant breeder rights bill was met with significant opposition in India from a range of groups, including the farmers' forum, non-governmental organisations, and, to some extent, the

²⁹ Utility Patent Act, 35 U.S.C. § 101. (USA)

³⁰ WTO, (2016). Overview: the TRIPS Agreement. https://www.wto.org/english/tratop_e/trips_c/intel2_e.htm

³¹ Kumar, Amarjeet, "Plant Varieties and Farmers" Rights Act, 2001, IIPRD BLOG INTELLECTUAL PROPERTY DISCUSSIONS (April 20. 2025) <https://iiprd.wordpress.com/2016/01/>

public sector. This opposition was principally driven by the likelihood of private companies dominating the seed industry. They could, for example, acquire original resources or parental lines from farmers' fields and/or public sector organisations and develop a variety or hybrid to assert ownership without compensating plant genetic material producers or saviours. Seeds were viewed as a sort of open sharing that was not protected by intellectual property rights.³² India is one of the first countries in the world to enact legislation that effectively guarantees breeders and farmers rights under a single Act. It is the only law in this field that recognises plant breeders' efforts in producing new plant types while also providing farmers with statutory rights without jeopardising their freedom. The statute recognises the farmer as both a grower and a conservator of agricultural plant types by preserving the farmer's plant variety.³³

PROTECTION OFFERED UNDER PPVFR ACT 2001

The Act's goals include developing an effective system for protecting plant varieties, protecting farmers' and plant breeders' rights, and accelerating investment in research and development in the seed industry, as well as ensuring farmers and other growers, such as horticulturists, have access to high-quality seeds and planting material of improved varieties. A variety is a grouping of plants with the lowest known rank in a single botanical taxon, determined by the expression of the features that come from a certain genotype or combination of genotypes.³⁴ In terms of its ability to be reproduced intact, the variety should be distinguished from other plant groups by its expression and treated as a unit.

Patents and plant variety protection are two types of IPR that both offer exclusive monopoly rights over the commercial establishment of a new plant variety throughout time. Plant variety protection gives plant breeders the right to protect the genetic makeup of a specific plant variety that has novelty, distinctness, uniformity, and stability. A patent is a right granted to an inventor to exclude all others from making, using, and/or selling the patented invention for 20 years for those inventions that meet the patentability criteria of novelty, non-obviousness, and utility.³⁵

The Indian sui-generis system of plant variety protection is also unique, because under this

³² www.i-scholar.in

³³ Mohan Dewan, IPR Protection in Agriculture: An Overview, JOURNAL OF INTELLECTUAL PROPERTY RIGHTS (April 20, 2025) <http://nopr.niscpr.res.in/>

³⁴ DSNLU publications - damodaram sanjivayya national law university (2023) DAMODARAM SANJIVAYYA NATIONAL LAW UNIVERSITY -. Available at: <https://dsnlu.ac.in/dsnlu-publications/> (Accessed: April 20, 2025).

³⁵ Mohan Dewan, IPR Protection in Agriculture: An Overview, JOURNAL OF INTELLECTUAL PROPERTY RIGHTS (April 20, 2025) <http://nopr.niscpr.res.in/>

Act a variety can be registered under either of four categories:

- New Varieties.
- Extant Variety.
- Farmer's Variety.
- Essentially Derived Variety. (EDV)

under the International Union for the Protection of New Varieties of Plants (UPOV)³⁶ member countries do not provide protection of varieties under the last two categories. Under the Protection of Plant Variety and Farmers' Rights Act, the period of protection in the case of registered varieties is 9 years in case of trees and vines and 6 years in case of other crops and upon renewal a maximum of 18 years for trees and vines and 15 years for other crops while in the case of extant varieties it is 15 years from the date of registration.³⁷

THE RIGHTS UNDER PPVFR ACT

The Indian PPVFR Act is remarkable in that it both recognises and defends farmers' varieties' rights. The Act deems it critical to recognise and preserve farmers' rights in light of their continued efforts to conserve, improve, and make plant genetic resources available for the development of new plant varieties. Furthermore, farmers are protected from unintended infringement.

The Act is intended to safeguard farmers against seed companies' inflated promises about the performance of their registered varieties. The Act also works to ensure that the seeds of these innovative kinds are of high quality, or that farmers are adequately informed about the seed quality they acquire. It underlines the importance of farmers' rights in light of their dedication to the conservation, enhancement, and availability of plant genetic resources for the development of new plant types.

The PPV&FR Act recognises farmers' different roles in producing, maintaining, creating, and choosing varieties. The Act refers to the economic importance that farmers put on wild species, traditional varieties, or germplasms through selection and identification while producing or choosing kinds.

³⁶ UPOV Conventions <http://www.upov.int/en/publications/conventions/> (Last visited April 20, 2025)

³⁷ MONDAQ, <https://www.mondaq.com/india/patent/1048568/challenges-in-plant-variety-protection-in-india>, (last visited April 20 2025)

One of the significant contributions of the Act is the Chapter on Farmers' Rights. It is intended to comprehensively address simultaneous promotion and sustenance of informal innovation in agriculture along with formal modern breeding.³⁸

Hence, the farmers' rights in the Act include³⁹:

- (a) the right to register new and existing varieties bred, evolved, and developed by farmers;
- (b) benefit sharing, recognition, and award for farmers and communities in recognition of their contribution to the evolution, conservation, and improvement of farmers' varieties used in breeding new varieties; and
- (c) the right to save, use, sow, resow, exchange, share, or sell farm produce, including seeds of new varieties.
- (d) recompense from the breeder of the new variety for the failure of the new variety's performance. (e) defence against unintentional infringement.
- (e) authorization for the use of essentially derived variety from farmers' variety in breeding;
- (f) exemption from all types of statutory costs.
- (g) the establishment and use of the Gene Fund; and

Breeders who register novel plant varieties have the right to prevent those kinds from being sold, exported, imported, or produced without their permission. It may also be illegal to use, sell, export, import, or manufacture any variety that is confusingly similar to the registered variety. Exemptions for using registered varieties as sources for new varieties and conducting tests are among the Act's safeguards for researchers' rights. To use a registered variety as a parental line for commercial production on a regular basis, however, breeder approval is required.⁴⁰

FARMERS' RIGHTS AND BREEDERS' RIGHTS: A BALANCING ACT

Farmers' varieties, whether long-established or recently developed, are the result of traditional and indigenous methods of natural breeding employed by farming communities. These methods—characterised by deep knowledge, observational skills, selection practices, and patient experimentation over seasons—include seed preservation, replanting, and local exchange systems. These forms of seed development are not random acts but rather represent

³⁸ Publications (2023) IPR Law India - Indian IP Law Resources. Available at: <https://iprlawindia.org/publication/> (Accessed: April 20, 2025).

³⁹ The protection of plant varieties and farmers' rights act, 2001, No.53, Acts of Parliament 2001 (India)

⁴⁰ Kumar, Amarjeet, "Plant Varieties and Farmers" Rights Act, 2001, IIPRD BLOG INTELLECTUAL PROPERTY DISCUSSIONS (Accessed: April 20, 2025) <https://iiprd.wordpress.com/2016/01/>

generations of skill and labour rooted in community-based agricultural knowledge.⁴¹

The National Commission on Farmers, constituted under the chairmanship of M.S. Swaminathan, highlighted various systemic challenges faced by Indian farmers. These included limited access to essential agricultural resources and the absence of a comprehensive public food distribution framework.⁴² In contrast, breeders, particularly those under international PVP systems, have historically enjoyed exclusive rights and greater control, leading to a perceived imbalance in rights and benefits distribution.

This context led to a growing recognition of “collective breeding”, wherein varieties developed by farmers are not viewed as the work of an individual but of the community at large. These varieties often bear traditional names or are associated with community practices. Even when a particular farmer contributes significantly to a variety, the overall preservation, dissemination, and improvement of that variety are typically communal efforts. Consequently, farmers’ varieties are increasingly acknowledged as community intellectual property, and several stakeholders advocated for community rights to be incorporated into the legislative framework during the drafting of the Protection of Plant Varieties and Farmers’ Rights Act, 2001.⁴³

On the other hand, the justification for exclusive breeders’ rights stems from the need to protect the economic interests of plant breeders. Without legal protection, there is a high risk of misappropriation of a new variety’s unique and commercially valuable genetic material. Since such material is capable of self-replication, it can be easily reproduced using seeds or other propagating tools, thereby undermining the breeder’s investments and innovation. Legal protection through plant variety registration discourages such misappropriation and provides an incentive for open scientific advancement.⁴⁴

The PPVFR Act grants a certificate of registration to the breeder of a protected variety, preventing unauthorized reproduction, marketing, and use of the variety to develop further

⁴¹ Ramesh Chand et al., *Revitalizing Agriculture in India: Policy Issues and Options*, 17 Econ. & Pol. Wkly. 23, 25 (2011).

⁴² Government of India, *Final Report of the National Commission on Farmers* (2006), Vol. I, at 5.

⁴³ The Protection of Plant Varieties and Farmers’ Rights Act, 2001, No. 53 of 2001, Statement of Objects and Reasons.

⁴⁴ Llewelyn, M. & Adcock, M., "The Plant Variety Rights Debate in India," 6 *J. World Intell. Prop.* 265, 270 (2003).

derivatives. However, the Act does allow for exceptions. Notably, Section 30 provides a “breeder’s exemption”, allowing other breeders to use the registered variety for developing new varieties.⁴⁵ Similarly, Section 39 provides a “farmer’s exemption”, enabling farmers to save, use, sow, re-sow, exchange, and even sell seeds of protected varieties, provided such sale is not branded or intended for commercial seed production.⁴⁶

While these exemptions attempt to strike a balance, emerging market-oriented agriculture has posed new challenges for farmers. The evolution of breeders’ rights into a formal intellectual property regime has compelled farmers to assert their historical freedoms, particularly the traditional practices of seed saving and informal exchange. In developing countries like India, farmers fulfil a majority of the nation’s seed requirements, with informal seed systems—such as farmer-to-farmer sharing—remaining a cornerstone of agricultural sustainability.

Nevertheless, the formalisation of plant breeders’ rights has increasingly constrained these practices. Many farmers, who once regularly reused seeds or exchanged them within communities, now find themselves encouraged—or compelled—to purchase new seeds annually, which is a marked departure from traditional practices. This shift in seed dynamics has generated friction between breeders and farmers, raising questions about the fairness of the IPR regime.

The guiding principle behind recognising farmers' rights under the PPVFR Act is rooted in equity, justice, and moral recognition. It affirms that those who have nurtured, conserved, and transmitted valuable plant genetic resources over generations deserve formal recognition and protection—whether or not that recognition takes the form of a property right. This framework reflects an important departure from conventional IPR regimes by incorporating social justice into the fabric of plant variety protection.⁴⁷

⁴⁵ The Protection of Plant Varieties and Farmers’ Rights Act, 2001, Section 30.

⁴⁶ *Ibid.*, Section 39.

⁴⁷ Mishra, S.N., "Protecting Farmers’ Rights in India: A Critique of the Indian PPV&FR Act," 12 *J. Intell. Prop. Rights* 81, 84 (2007).

OTHER FORMS OF INTELLECTUAL PROPERTY PROTECTION IN AGRICULTURE

Beyond patents and plant variety protection, various other intellectual property tools play a significant role in safeguarding agricultural innovation and branding.

Trademarks can be effectively employed in the agricultural sector to market seeds, agrochemicals, and related services such as crop spraying. The primary function of a trademark is to distinguish one enterprise's goods and services from those of another, thereby ensuring consumer trust and preventing confusion or deception in the marketplace. This form of protection helps prevent the unauthorised use of commercial symbols or logos and, while not subject to a fixed term, does require periodic renewal to maintain its validity.⁴⁸

Among the most relevant forms of trademarks in agriculture are Geographical Indications (GIs). GIs identify products as originating from a specific location—such as a country, region, or locality—where the product's quality, reputation, or other characteristics are essentially attributable to its geographic origin.⁴⁹ In agriculture, GIs are especially significant because the qualities of many farm products are closely linked to soil, climate, and traditional cultivation practices. Prominent examples include "Darjeeling" for tea, "Devgad" and "Ratnagiri" for Alphonso mangoes, and "Tasgaon" for premium grapes, all of which are closely tied to specific Indian locales.⁵⁰

Plant varieties rooted in traditional knowledge and associated with a specific region may also be eligible for GI protection. One of the advantages of GIs is that, unlike plant patents or plant breeders' rights, they are not time-bound. However, the commercial value derived from GI protection often depends on the degree to which the geographical name becomes recognised in the marketplace for specific agricultural goods.

In addition to trademarks and GIs, trade secret protection offers another method for safeguarding innovations in agriculture. This is particularly useful for protecting hybrid plant varieties, where the specific breeding techniques or parentage formulas are kept confidential.

⁴⁸ The Trademarks Act, 1999, No. 47 of 1999, § 25.

⁴⁹ World Trade Organization, *TRIPS Agreement*, Art. 22(1) (1994).

⁵⁰ Office of the Controller General of Patents, Designs and Trade Marks, *GI Registry of India*, available at <http://ipindia.gov.in> (last accessed Apr. 2025).

In contrast to patents, trade secrets do not require disclosure of the protected information to the public, and the protection remains valid as long as the information remains undisclosed and undiscovered by third parties. However, once a trade secret is independently discovered or reverse-engineered, the legal protection is automatically forfeited.

Together, these forms of intellectual property supplement the broader IPR framework in agriculture, offering tailored mechanisms to protect innovation, branding, and traditional knowledge within the sector.

CONCLUSION

To ensure a more equitable and inclusive system of intellectual property rights in agriculture, it is imperative that the government periodically revises and updates relevant legislation. These revisions should be aimed at effectively protecting the interests of all stakeholders—including local industries, farmers, scientists, and markets—while simultaneously serving the broader public interest.

Patent rights should be perceived not merely as exclusive entitlements, but rather as a mechanism to incentivize innovation. The temporary monopoly granted by a patent is intended to encourage the development of new technologies and the public disclosure of innovations. However, if these rights are granted without a coherent strategy or consideration of broader implications, the patent system may fail to attract meaningful innovation or may even reward inventions with potentially harmful consequences.

The impact of a patent depends largely on the nature of the underlying innovation. Some inventions may generate considerable social benefit, while others could pose risks to public welfare. In such cases, indiscriminate granting of patents—particularly without assessing their socio-economic and environmental effects—may promote the spread of detrimental technologies, while discouraging the creation of safer, more sustainable alternatives. Furthermore, the enforcement of exclusive rights, even for a limited duration, can result in restricted access for underprivileged populations, raising significant concerns about equity, justice, and human rights. This is particularly relevant in critical sectors such as healthcare and agriculture.

Therefore, the scope of patentable subject matter must be carefully defined to reflect these realities and to mitigate adverse consequences. Amid increasing global scrutiny—especially in developing and least-developed countries—India has sought to adopt a balanced approach that harmonizes international obligations with domestic priorities. The Protection of Plant Varieties and Farmers' Rights Act, 2001, is often praised for its innovative framework that incorporates conservation, benefit-sharing, and farmers' rights. Nonetheless, despite its progressive intentions, the Act is not without implementation challenges, which must be addressed with diligence, foresight, and fairness.

