

Intellectual Property Rights: Protecting Plants for Food Security

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Abstract

Food security is dependent on seed security and ensuring the timely availability of quality seed in desired quantity at right time at appropriate price is fundamental to increase production and productivity. Increasing population pressure, diminishing natural resources, increased frequencies of extreme events due to climate change further aggravate the problems. With these challenges the country needs to double its food production due to increased income and diversification of diets by 2050.

The contribution of Farmers' Varieties being climate resilient, is very significant for food and nutritional point of view particularly for small and marginal farmers in low input marginal conditions. Development of new plant varieties alone cannot sustain agricultural productivity improvement unless the varieties are protected to ensure correct usage for their best performance while the plant breeders are encouraged to improve the varieties further.

The extension of IPRs to agriculture is of special significance because agriculture and food security are closely interlinked. We shall be discussing in this article about the importance of Intellectual Property Rights for plant varieties and their role in the development of new plant varieties which are climate resilient, meets the nutritional requirement and are tolerant to various biotic and abiotic stresses.

Keywords: Intellectual property rights, Food security, Plant variety protection, Farmers rights, Seed replace rate, Farmers' rights.

1 Introduction

The Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS), an international agreement administered by the World Trade Organization (WTO), set standards for many forms of intellectual property (IP) regulations. The Article 27.3 of TRIPS states that "Members may also exclude from patentability (a) diagnostic, therapeutic and surgical methods for the treatment of humans or animals; (b) 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. However, Members shall provide for the protection of plant varieties either by patents or by an effective *sui generis* system or by any combination thereof".

Keeping in view the national requirement and international commitment under Article 27(3) (b) of TRIPS Agreement, India adopted a *sui generis* system for plant variety protection and Government of India enacted the "Protection of Plant Varieties and Farmers' Rights (PPV&FR) Act, 2001" with farmers' rights being the unique feature emphasizing

farmers' rights as positive rights. The PPV&FR Act 2001 in India takes care of the farmers, breeders and industry and is unique IP Right (Singh and Agrawal, 2018).

This Act has also mandate for recognizing the contribution of the farmers in respect to the contribution of the conservation of plant genetic resources and makes them available for the development of new varieties and also promotes innovation in terms of development of new varieties of plant and conservation of plant genetic resources in agro-biodiversity hot spot to make available unique germplasm which may be used for development of new varieties. The Act provides intellectual property rights not only to plant breeders but also to the farmers by protecting new, extant and farmers' varieties. Although a number of IPRs are available in India, the PPV&FR Act 2001 is unique and balanced Act which takes care of the farmers, plant breeders, researchers and seed industry.

The major objectives of the PPV&FR Act include providing an effective system for protection of plant varieties and rights of farmers and plant breeders, recognizing and protecting the rights of farmers in respect of their contribution made at any time in conserving, improving and making available plant genetic resources for the development of new plant varieties, contributing to accelerate the agricultural development in the country, stimulate investment for research and development in public/private sector for development of plant variety; and facilitating the growth of seed industry.

This legislation provides a more comprehensive framework for Plant Variety Protection (PVP) containing various provisions different from International Union for the Protection of New Varieties of Plants (UPOV) model (Prabhu and Agrawal, 2018).

This Indian Act shall stimulate public and private investment in plant breeding research for the development of new plant varieties, facilitate the growth of seed sector for ensuring the availability of quality seeds and planting material to the farmers. PPV&FR Act, 2001, is an effective *sui generis* system to provide for an effective implementation for protection by both plant breeders and farmers and is the first of its own kind in the world. It befits the national situation yet matching the global commitment. Keeping in view of the millions of farming communities whose efforts for conservation of landraces and wild types since ancient times were the basis of plant breeding and Green Revolution in India that provides for food security to a more than one billion population and also in light of FAO and CBD Agenda 21, this Act shall be an important factor in not only encouraging farmers to conserve their varieties but also in the development of new plant varieties which may be climate resilient, and to meet the food and nutritional requirement for increasing population.

2 Formal vs. Informal Seed Sector in India and Farmers' Rights

Seed security is pre-requisite to food security and according to the 70th Round of National Sample Survey (2012-13), at all India level, average expenditure on crop production per cultivating agricultural household, about 24% of the expenditure was made on fertilizers and manures, 21% on human labour and nearly just 11% of the total expenditure made on seeds (NSSO, 2016). Therefore, having the lowest cost of seed as input with relatively high output, has been established that in India, through quality seed alone, 20-25% higher productivity can be obtained.

The formal seed sector in India contributes only about 30-35% of the total seed requirement in India while informal seed sector's contribution is enormously high, mainly in

the form of farmer's own seed and commonly known as FSS (Farmer saved seeds) to the tune of 65-70% (DAC & FW 2016a), thereby reflecting low seed replacement rates (SRRs).

On the basis of input survey (2011-12), conducted by the Agricultural Census Division of “Department of Agricultural Cooperation and Farmers Welfare” (DAC&FW), Ministry of Agriculture and Farmers Welfare's (Government of India) published report in 2016, out of a total of 138.11 million operational holdings, only 39.41% used certified seeds while 26.96% used seeds of notified varieties (DAC&FW 2016b), clearly establishes the fact that in addition to the poor SRRs, the varietal replacement rates (VRRs) are even more poor. The QDS (Quality declared seed system) policy of the Food and Agricultural Organization can easily accommodate and integrate the registered farmers varieties as per PPV&FR Act (2001) into seed chain effectively and efficiently (Singh and Agrawal, 2018).

Keeping in view the use of the quality seeds by farmers and to support and encourage the farmers to conserve their traditional varieties, following provisions related to Farmers' Rights have been incorporated in section 39 and Gene Fund under section 45 of the PPV&FR Act, 2001-

1. If a farmer breeds or develops a new variety shall be entitled for registration in the like manner as a plant breeder.
2. The farmer is also entitled to save, use, sow, resow, exchange, share or sell his farm produce including seed of a registered variety under the Act like wise entitled before the enforcement of the Act. Farmers are not entitled to sell branded seed of the variety registered under the Act.
3. Farmers' Variety is the variety which has been traditionally cultivated and evolved by the farmers in their fields or is a wild relative or land race of a variety about which the farmers possess the common knowledge.
4. Farmers are exempted from payment of any fees in respect any proceeding, inspection of any document or obtaining any decision/order/document under the Act before the Registrar/Authority/tribunal/High Court.
5. Compensation to the farmers:- farmers are entitled to the compensation in case of failure of expected performance by registered varieties under the given condition.
6. Rights of communities/ compensation - any person on behalf of any village community file any claim for compensation if the village or local community has contributed significantly to the evolution of the variety which has been registered under the PPV&FR Act, 2001. The Authority upon receiving objection from the registered breeder shall give an opportunity to breeder and determine the compensation which should be deposited in the Gene Fund within a period of two months.
7. Protection of innocent infringement: - A right established under the Act shall not be deemed to be infringed by a farmer who at the time of such infringement was not aware of the existence of such right and a relief in an infringement suit shall not be granted by court against a farmer who proves at the time of infringement he was not aware of the existence of the right so infringed.
8. Compulsory license: - The Authority can grant compulsory license after the expiry of three years from the date of issue of a certificate of registration of a variety on the ground of inadequate supply, unreasonable price to the public with the consultation on Central Government.
9. Benefit Sharing: -The claims after due examination and receiving counter-claims will be disposed by the Authority. The benefit claim will be decided after providing proper and fair opportunity to be heard to both the claimer and Breeder.

In addition to farmers rights, the breeders, researchers and community rights were also framed in the PPV&FR Act, 2001 as follows:

- A. **Breeders' Rights:** Breeders will have exclusive rights to produce, sell, market, distribute, import or export the protected variety. Breeder can appoint agent/licensee and civil remedy in case of infringement of rights.
- B. **Researchers' Rights:** Researcher can use the variety using such variety for conducting experiment or research, use of the variety as an initial source of variety for the purpose of developing of another variety but repeated use requires prior permission.
- C. **Community Rights:** Under section 41 any person on behalf of any village community file any claim for compensation if the village or local community has contributed significantly to the evolution of the variety which has been registered under the PPV&FR Act, 2001. Compensation to be determined by the Authority and deposited in National Gene Fund.

The development of new plant varieties cannot sustain, unless they are protected in order to ensure their correct usage, even while breeders are encouraged to improve these further. The PPV&FR Act, 2001 balances both the Farmers' Rights and Breeder's Rights. Soon after the enactment of the PPV&FR Act, there was an argument that Farmers' Rights (FR) provided in *sui generis* system may dilute plant breeder's rights (PBR) and may affect the private investment. In addition to potential opposition from plant breeders in the formal sector, the challenge for PPV&FR Act will be when it is implemented. But today, the Act has demonstrated to the world community that it is one of the most balanced Act.

3 Role of IP in Food Security

Access to food, water and shelter constitutes a human right across the world. The food security of any country is directly linked to its agricultural policies and trade policies. One of the important aspect of the agricultural policy is the protection of the plant varieties through intellectual property rights so as to achieve security for investors in the seed sector to ensure people will continue to invest. Investment in the field will help to combat global food security issues and the increasing role of public-private sector engagement. With the technological advances globally in the agricultural industry, the use of plant varieties and genetically modified food products has taken off, and it is an essential aspect of the regulatory framework that the products still maintain their nutritional value (https://www.stalawfirm.com/en/blogs/view/intellectual-property-and-food.html?utm_source=Mondaq&utm_medium=syndication&utm_campaign=View-Original). [The introduction of IPR in agriculture helps in in achieving economic benefits for agricultural cultivators to make available sufficient food supply.](#)

The International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) establishes a concrete balance between access to biodiversity for incremental innovation and benefit-sharing to reward farmers for on-farm conservation and management of such biodiversity by having a provision to "facilitate the exchange of seeds and other germplasm for research, breeding, and crop development." This Treaty creates a multilateral gene pool. Those creating commercial products that incorporate its plant genetic resources must pay a percentage of their profits into a fund used to promote conservation and sustainable use of plant genetic resources except when such a product is available without restriction to others for further research and breeding (e.g. plant varieties protected according to the UPOV system). The treaty seeks to manage the intellectual property associated with a

defined set of genetic resources resulting from a combination of collective and individual innovation to conserve a public good.

Being signatory to the Convention on Biological Diversity (CBD), Govt. of India enacted the Biological Diversity Act (BDA), 2002 and also notified the Biological Diversity Rules (BDR) 2004 and established National Biodiversity Authority (NBA) in 2003. At national level, access to biological resources from India is now regulated by BDA, 2002 and BDR, 2004. No person can apply for any IPR in or outside India for any invention based on any research or information on a biological resource obtained from India without obtaining approval from NBA. The Act regulates access to biological resources of India and also provides for benefit sharing in case of access to such resources (<http://nbaindia.org>).

Some of the issues like the rights under one act does not gets impeded by another act, the overlapping of clearances between various regulatory bodies so as to make the genetic resources more accessible for research, synergies between regulatory bodies and related public/private sectors for achieving various provisions of the PPV&FR Act, 2001 have been discussed in this article (Agrawal and Prabhu, 2019).

4 Response of Farmers and Breeders in Seeking IPR on their Plant Varieties

The PPV&FR Authority has received 16611 applications of crop varieties including 10910 from farmers alone (66%) during the last 12 years (Table 1). A total of 3625 varieties have been protected of which 1597(44%) belongs to farmers (Table 1). Maximum varieties by farmers are submitted under the crop group “cereals” which is the basis for the most important food items and is followed by legumes (Table 1).

Agro-Biodiversity rich states namely Jharkhand, Chhattisgarh, Madhya Pradesh, Odisha and West Bengal led the group of states in filing the applications for seeking the IP protection under PPV&FR Act, 2001(Table 2) which indicates a growing awareness amongst the farmers about protection of their varieties so as to claim benefit sharing in case of the use of such protected varieties in breeding programs and to avoid any misuse of their protected genetic wealth.

Table 1: Applications received under various crop groups and registration certificates issued (including farmers’ varieties)

Crop Group	Application received		IPR Certification issues	
	Total	Farmers’ Varieties	Total	Farmers’ varieties
Cereals	9248	6912 (75)%	2587	1562 (60)%
Cucurbits	511	396 (77)%	10	
Fibre Crops	1207	19 (2)%	342	1 (0)%
Flowers	82	48 (59)%	1	
Fruits	715	639 (89)%	2	
Legumes	1494	1196 (80)%	190	12 (6)%
Medicinal and Aromatic plants	18	15 (83)%		
Oilseeds	1010	624 (62)%	247	13 (5)%
Plantation crop	29	10 (34)%	6	

Spices	523	488 (93)%	27	9 (33)%
Sugar Crops	106	35 (33)%	48	
Trees	8	1 (13)%		
Vegetables	1660	527 (32)%	165	
Grand Total	16611	10910 (66)%	3625	1597 (44)%

(Source://http://www.plantauthority.gov.in)

Table 2: Farmers' varieties received from various states of India for registration and registration certificates issued

State/Union Territory	Applications received	Certificates issued
1. Andaman & Nicobar Islands	7	5
2. Andhra Pradesh	10	
3. Arunachal Pradesh	9	
4. Assam	472	6
5. Bihar	583	5
6. Chhattisgarh	1800	335
7. Delhi	1	
8. Goa	2	
9. Gujarat	10	
10. Haryana	9	1
11. Himachal Pradesh	138	4
12. Jammu & Kashmir	170	
13. Jharkhand	2417	105
14. Karnataka	212	
15. Kerala	62	29
16. Madhya Pradesh	1317	49
17. Maharashtra	146	4
18. Manipur	324	8
19. Meghalaya	200	
20. Mizoram	79	
21. Nagaland	133	
22. Odisha	979	761
23. Punjab	4	2
24. Rajasthan	26	8
25. Sikkim	2	
26. Tamil Nadu	13	6
27. Telangana	5	3
28. Tripura	149	1
29. Uttar Pradesh	619	23
30. Uttarakhand	69	7
31. West Bengal	943	235
Grand Total	10910	1597

(Source://http://www.plantauthority.gov.in)

5 Relevance of National IPR Policy (2016) for Seed Sector

Government of India in their National Intellectual Property Rights Policy announced during 2016 has indicated the number of filings and registrations by the Protection of Plant Varieties and Farmers' Rights Authority very encouraging and has asked to provide support to various stakeholders for increased registration of new, extant and essentially derived varieties of plants. It has further emphasised to establish links between the Authority and Agricultural Universities, Research Institutions, Technology Development & Management Centers and Krishi Vigyan Kendras and facilitate development of seeds and their commercialization by farmers. It makes the Authority more responsible to focus on strategies for mainstreaming of registered farmers' varieties and to take breeders rights as envisaged in PPV&FR Act, 2001 to every concerned stakeholder and make India as a forerunner in the implementation of not only farmers' rights but also the breeders' rights.

6 Conclusions

The introduction of IPRs in plant varieties is justified by the need to foster food security in the long-term (Cullet, 2003). The contribution of Farmers Varieties being climate resilient is very significant for food and nutritional point of view particularly for small and marginal farmers in low input marginal conditions. With the technological advances globally in the agricultural industry, the use of plant varieties and genetically modified food products has taken off, and it is an essential aspect of the regulatory framework that the products still maintain their nutritional value. The Indian PVP&FR Act is an effective sui generis system providing a balance between plant breeders' rights along with farmers' rights and researchers' rights. The practice of small, marginal farmers to exchange the harvested material with others are essential for their livelihood and being practices not only in India but to a large extent to most of the developing countries in Asia-Pacific. The PPV&FR Authority through various provisions of the PPV&FR Act ensures the availability of quality seeds of registered varieties and also supports farm families for conservation and sustainable use of genetic resources including in-situ and ex-situ collections and for strengthening the capability of the stakeholders in carrying out such conservation and sustainable use.

The IPRs will be critical in achieving security for investors in the agrarian sphere to ensure the continuous investment by people. Investment in the field will help to combat global food security issues and the increasing role of public-private sector engagement.

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