Intellectual Property Rights on Plant Varieties in India: A Sector-Wise Analysis

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With the increased investment from private sector in agriculture, IPR in plant varieties has become a matter of debate and discussion. Several legislations have been formulated from time to time in compliance with various national and international obligations. The PPV&FR Act, 2001 was formulated in accordance with Article 27.3(b) of TRIPS Agreement, 1995. The present study focuses on development in Indian agriculture with reference to IPR granted under the Act. The study also analyses and determines the focus of public and private sector research and the trend of early filing for grant of IPR in both public and private sector. The awareness of the PPV&FR Act among farmers, the custodians of traditional varieties, is also determined by trend analysis of farmers’ variety applications received from various states across India. Based on trend analysis, the technology trend in plant varieties protected under the Act is highlighted.

Keywords: Convention on Biological diversity, World Trade Organization, Trade Related Aspects of Intellectual Property Rights, essentially derived variety, variety of common knowledge, intellectual property rights

The concept of IPR in plant varieties gained momentum with increased investment of private sector in agriculture and flourishing private seed industry. Further, The Convention on Biological diversity (CBD), 1993 by giving sovereign rights to nations over their Plant Genetic Resources (PGR) also raised concerns about breeders’ rights, farmers’ rights, right to communities engaged in conservation of biological resources. India being a signatory to World Trade Organization (WTO)/ Trade Related Aspects of Intellectual Property Rights (TRIPS) Agreement, 1995, has opted sui-generis system for protection of plant varieties in compliance with Article 27.3 of TRIPs Agreement. The outcome of sui-generis system was enactment of ‘The Protection of Plant varieties and Farmers’ Rights (PPV&FR) Act, 2001’ herein after mentioned as the Act. The Act became functional with the establishment of The PPV&FR Authority in 2005, hereinafter mentioned as the Authority. The major objectives of the Act are to provide an effective system for the protection of plant varieties, the right of farmers and plant breeders; to encourage the development of new varieties and to recognize and protect 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. The present communication determines the effectiveness of the system by carrying out detailed analysis of status and trend of plant varieties protected and rights granted to breeders and farmers under the Act.

A variety is eligible for registration under the Act if it fulfills the criteria of Distinctiveness, Uniformity and Stability (DUS) i.e. the candidate variety must be distinguishable by at least one essential characteristic from all varieties of common knowledge in any country at the time of filing the application, sufficiently uniform in expression of its essential characteristics which would remain unchanged even after repeated propagation. The variety should also have a single and distinct denomination. Further, the application for registration can be made either under new or ‘extant’ category depending on the date of first sale of the candidate variety. If a variety is commercialized in India for less than one year in case of other crops and four years for trees and vines, from the date of filing of application in the Authority, it would be considered under new category, otherwise in the ‘extant’ category. The criterion for registration of farmers’ variety is same as that for new and ‘extant’ varieties. Further, essentially derived variety (EDV), a variety derived from an initial variety (IV), retaining the expression of all the essential

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characteristics of the IV, except for the difference that results from the act of derivation is also a subject matter of registration under the Act. The newly bred variety is registered as per the provisions and rules under the Act.

Upon acceptance of the application, the candidate variety undergoes DUS testing for two years in case of new variety and one year in case of ‘extant’ variety at two DUS test centers in the same cropping season. If the DUS test results are in compliance with the claimed distinct characteristics, the passport data of candidate variety is published in the Plant Variety Journal of India (PVJI) for inviting opposition within 90 days. When the pre-grant opposition period is over and no opposition is filed, the certificate of registration is granted to the applicant and its details are published in the PVJI. The certificate of registration issued is valid initially for a period of nine years in case of trees and vines and six years in other cases. The total duration of protection is eighteen years in case of trees and vines and fifteen years in other cases, subject to renewal upon expiry of initial period of registration. In order to maintain the registration, the applicant is required to pay annual fee in prescribed manner.

Farmers are exempted from every kind of fee other than annual fee. Traditionally cultivated farmers’ varieties with unique characteristics have also been received from various states mainly from the rice growing states, of India. Upon acceptance, the variety undergoes one year grow out testing for confirmation of DUS characteristics as per crop specific DUS test guidelines. Rest of the procedure of registration is same as that for new/ ‘extant’ varieties.¹

This study focuses on the development in Indian Agriculture R&D with reference to IPR claimed under the Act. The paper provides useful insight into the pattern of registration with the PPV&FR Authority since its inception, crop wise and sector wise. The trend analysis of plant variety applications received during the period 2007 (30 July 2014) aims at determining the technology trend in filing of plant variety applications, crop species that covers majority of applications filed and its type (typical, hybrid, parental line, transgenic, others) and the overall impact of registration of newly bred varieties on the growth of agriculture in India. The analysis further extends to determine the focus of public and private sector research in the light of IPR applied and granted. Further, the study also tries to determine the trend of early filing in both the public and private sectors that indirectly correlate with the commercialization of their varieties. As the Act recognizes the farmer as a ‘breeder’, hence, keeping this in view, the author tried to find out the status of filing of farmers’ variety and crop species of their interest. This in turn highlights the awareness among the farmers’ about the Act.

The data analysed herein has been compiled from the details of the applications received by the PPV&FR Authority or data published in PVJI.²

### Analysis of Plant Variety Applications Received

The Authority was established on 11 November 2005 and started receiving applications in 2007. Initially applications of 12 crop species mainly, cereals, pulses and millets, notified in 2006 as per Section 29.2 of the Act, were eligible for registration. Later species of fibers, oilseeds, vegetables, ornamental plants, spices and condiments of economic importance were notified. Till date, 79 crop species of great economic importance, as mentioned below have been notified in VIII schedules (Table 1). New varieties of all these crops are eligible for registration under the Act. As per Rule 24.2 of the Act, the ‘extant’ and ‘farmers’ varieties are eligible for registration, only if application for registration, is made within three and five years respectively, from the date of Gazette Notification of that crop species.

<table>
<thead>
<tr>
<th>Table 1—Crop species notified for registration under the Act</th>
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<tr>
<td>Category</td>
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<tr>
<td>Cereals</td>
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<tr>
<td>Pulses and millets</td>
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<tr>
<td>Fiber crops</td>
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<tr>
<td>Oilseeds</td>
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<td>Vegetables</td>
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<td>Ornamentals</td>
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<tr>
<td>Fruits</td>
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<tr>
<td>Spices</td>
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<tr>
<td>Sugar crop</td>
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<tr>
<td>Medicinal &amp; aromatic</td>
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<tr>
<td>Plantation crops</td>
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¹ This study focuses on the development in Indian Agriculture R&D with reference to IPR claimed under the Act.
² The data analysed herein has been compiled from the details of the applications received by the PPV&FR Authority or data published in PVJI.
under Section 29.2 of the Act. After the expiry of said duration, the ‘extant’ and farmers’ variety will be registered only as a special case.

**Annual Sector-Wise and Category-Wise Application Trend**

As on 30 July 2014, the Authority received 7506 applications under ‘new’, ‘extant’, ‘farmers’ and essentially derived variety (EDV) category as mentioned in Table 2. The year-wise analysis of applications received, shows an increasing trend whereas applicant-wise trend analysis shows an increasing trend till 2009 followed by an inconsistent pattern as shown in Table 2.

High peaks of 2011 and 2013 in the number of applications received i.e. 1361 and 1677 respectively, are mainly because of receipt of a large number of farmers’ variety applications. Category-wise analysis of total applications received annually, shows that a large number of applications of new varieties were received in 2010 and 2013 i.e. 420 and 348 respectively. Majority of these applications are parental/inbred line of cotton varieties received from the private sector. During rest of the years, the number of applications received under ‘new’ category is around 150. Trend analysis of applications received under ‘extant’ category shows that around 350 applications were received annually during first three years of setting up of the authority followed by a sharp decline in year 2010, only 95 applications were received during that year. Later, in 2011-2013, the graph again rises and the number of ‘extant’ variety applications received annually is around 250 during the said duration. Where Public sector is more active in filing applications for ‘extant notified typical’ varieties of cereals, pulses and millets received during that period. As the duration of registration of ‘extant’ varieties is three years from the date of notification of crop species in the Gazette, hence cereals and pulses notified in 2006, the ‘extant’ varieties of these crops cannot be registered after 2009, provided the Registrar may accept the ‘extant’ variety application of said crop species as a special case. Hence, the number of applications of these crop species shows a decreasing trend. Only new applications of cereals and few applications of recently notified crops together constitute 31 applications received in 2010. In years 2011 and 2012, uniformity was observed in number of applications received, followed by a slight increase in 2013. As the ‘extant’ notified varieties contributes to majority of public sector applications hence when

<table>
<thead>
<tr>
<th>Variety/year</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>Total</th>
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<tr>
<td>New</td>
<td>74</td>
<td>137</td>
<td>166</td>
<td>420</td>
<td>145</td>
<td>144</td>
<td>348</td>
<td>161</td>
<td>1595</td>
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<tr>
<td>‘extant’</td>
<td>356</td>
<td>395</td>
<td>393</td>
<td>95</td>
<td>268</td>
<td>253</td>
<td>257</td>
<td>123</td>
<td>2140</td>
</tr>
<tr>
<td>Farmer</td>
<td>2</td>
<td>5</td>
<td>127</td>
<td>4</td>
<td>939</td>
<td>302</td>
<td>1001</td>
<td>1254</td>
<td>3634</td>
</tr>
<tr>
<td>EDV</td>
<td>0</td>
<td>10</td>
<td>2</td>
<td>21</td>
<td>9</td>
<td>0</td>
<td>71</td>
<td>24</td>
<td>137</td>
</tr>
<tr>
<td>Total</td>
<td>432</td>
<td>547</td>
<td>688</td>
<td>540</td>
<td>1361</td>
<td>699</td>
<td>1677</td>
<td>1562</td>
<td>7506</td>
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</table>

In farmers’ varieties, 4 ‘new’ variety applications of rice (2) and wheat (2) were obtained. Rest of them was filed under ‘extant’ category. A major portion nearly 80%, of ‘farmers’ variety applications received were of rice, rest of the crops contributes to only 20%. Hence, it can be concluded that majority of traditional rice varieties are filed for registration under farmers’ category.

**Analysis of Applications Received from Public Sector**

The number of applications received shows an increasing trend initially with a sharp decrease in 2010, when only 31 applications were received as shown in Fig 1. It is mainly because of a large number of ‘extant notified typical’ varieties of cereals, pulses and millets received during that period. As the duration of registration of ‘extant’ varieties is three years from the date of notification of crop species in the Gazette, hence cereals and pulses notified in 2006, the ‘extant’ varieties of these crops cannot be registered after 2009, provided the Registrar may accept the ‘extant’ variety application of said crop species as a special case. Hence, the number of applications of these crop species shows a decreasing trend. Only new applications of cereals and few applications of recently notified crops together constitute 31 applications received in 2010. In years 2011 and 2012, uniformity was observed in number of applications received, followed by a slight increase in 2013. As the ‘extant’ notified varieties contributes to majority of public sector applications hence when
new crop species were notified for registration, the public sector institutions actively file the ‘extant’ variety application and after the completion of three years from the date of notification of said crop, the graph of applications received in those crop species also comes downward. Although majority of applications filed by the public sector are for ‘extant notified varieties’, every year some of the ‘newly bred varieties’ of cereals sought registration under the Act.

Out of 1314 applications received from the public sector during 2007-2014, the majority of applications are for typical varieties (1094). A few hybrids (209) were also developed for both self pollinated and cross pollinated crops namely, maize (70), pearl millet (39), cotton (36), sorghum (19) and rice (11). Some hybrids of vegetables, oilseeds and flowers were also filed, but their number is below 10. Some more applications (11) of Cytoplasmic Male Sterile (CMS) lines and mutant varieties are also received from public sector. It clearly indicates that a significant percentage of public sector research is for development of typical varieties that can be saved and re-sown by farmers. The breeding method used for development of ‘extant typical varieties’ is mainly by selection/controlled pollination. Majority of new varieties are also typical varieties. Hence, it can be concluded that the research in the public sector institution is carried out with the objective to provide farmers with ‘new improved typical varieties’ which can be used further as farm-saved-seed for re-sowing. Majority of hybrids filed by the public sector are under ‘extant’ category. This is because of commercialization of the variety before one year from the date of filing of application for registration. Lack of awareness about the provisions of the Act and benefits of IPR may be the reason for it. However, such practices should be避免, as early release of the variety without applying for IPR raises the chances of its duplication by third party. Further no complaint for infringement of the variety may be filed at the Authority before the date of filing. Out of the 79 crop species notified, applications for only 38 crop species were received from the public sector as shown in Fig 2.

The majority of applications received are 593 for cereals [rice (242), wheat (127), maize (117) and sorghum (107)] and 150 for fibres [cotton (123), jute (27)]. Uniformity is observed in the number of applications received for pulses and millets, rapeseed and mustard, groundnut and sugarcane. Among vegetables, brinjal (20), potato (18) and tomato (15) top the chart for registration. For rest of the vegetables and oilseed crops notified, the number of applications received is below 10. Few applications of spices, below 10, were also received from public research organizations. Among flowers and fruits, 4 applications for Chrysanthemum were received. No applications for fruit (mango) and medicinal plants were received from the public sector during the reporting period. It is expected that applications of recently notified crop species of cucurbits, fruits, plantation crops and barley may be received from the public sector in the coming years.

Analysis of Applications Received from Private Sector

The number of applications received from the private sector shows an increasing trend till 2010 followed by constant uniformity in 2011-2012. This was followed by a big jump in 2013. Majority of applications filed by the private sector are under ‘new’ category. This shows that private sector is well aware of the benefits of early filing and importance of IPR. This in turn will give a competitive edge for them over their competitors and prevent duplication or infringement of the newly bred variety. Out of 79 crop species notified, applications are received only for 30 crop species from the private seed companies as shown in Fig 3.

Analysis of applications received from the private sector reveals that private sector is focused on a few notified crop species. Maximum applications were received for cotton (931). Among cereals, majority of applications received were for rice (260) and maize

**Fig. 2**—Major crops (top 10) for which applications were filed by the public sector.
(252) varieties. Vegetables like brinjal (233), tomato (210), okra (105), and cauliflower (47) are also their area of interest. Applications for IPR were also made for coarse cereals sorghum (85) and pearl millet (180). Among oilseeds, majority of applications received were for sunflower (93) and rapeseed and mustard (21); and soybean (10). Some type varieties of wheat (20) and pigeon pea (21) also sought registration. For the rest of the crop species notified, either no application was received or their number is below 10. Among recently notified cucurbits, applications for bitter gourd (15) and bottle gourd (9) were received. 5 applications for rose varieties and 12 applications for potato were received from foreign applicants.

Analysis of applications received from the public and private sectors depicts that private sector is applying for IPR for those crop species in which public sector applications are quite low. For example, in wheat, majority of applications (for typical varieties) were received from public sector, whereas private sector applications are less than 10 per cent. On the other hand, for vegetables, majority of applications (hybrids) were filed by private sector, whereas very few applications were made by public sector. Thus, public sector is focused on staple self-pollinated cereals and private sector is interested in cross pollinated crops mainly cotton and maize; and a few self-pollinated varieties like, rice, brinjal, tomato and okra.

Year-wise analysis of the applications received from the private sector reveals that private sector’s focus is on hybrid/transgenic hybrid crops filed under ‘new’/‘extant’ category. Transgenic hybrids of cotton are also subject matter of IPR applied. Applications of inbred parental lines or transgenic parental line were also received. Right from the beginning, the breeding method used for the development of hybrids was mainly heterosis. Induced mutation was also used in few cases. In case of vegetables, varieties were developed by crossing CMS lines (A, B and R lines). Applications of R lines were received from both public and private sector.

Analysis of Farmers’ Variety Applications Received

Before CBD, Plant Genetic Resources (PGR) was treated as ‘heritage of mankind’. The conservation, sustainable utilization and access to biological diversity were considered as national sovereignty by the CBD. The PPV&FR Authority is making effort to conserve farmers’ varieties, landraces and wild relatives of varieties, about which, farmers possess the common knowledge. Further, ‘Plant Genome Savior Community Award’ and ‘Farmers’ Reward’ are organized annually to recognize the immense contribution of farmers in the conservation and preservation of plant genetic resources. The registration of farmers’ varieties is expedited, so that such traditional varieties are not utilized by third party in the development of hybrids without benefit sharing.

Year-wise analysis of farmers’ variety applications received, shows that, till 2013, farmers’ variety applications received were limited to very few crop species namely cereals and pulses notified in late 2006. Since 2013, applications were received for about 48 notified crop species of cereals, pulses, oilseeds, fruits and vegetables and some of the recently notified cucurbits also. However, the majority of applications received were for the staple food crop rice (3036). This was followed by maize (78), mango (61), rapeseed and mustard (36), pigeon pea (34), blackgram (32), sorghum (29) and kidney bean (22). For rest of the notified crop species, the applications received are below 20.

Analysis of Essentially Derived Variety Applications Received

EDVs are gaining importance day by day. The number of applications for EDV received varies annually. In 2008, only 10 applications for tetraploid cotton carrying Bt gene were received. However in 2013, maximum number of EDV applications, i.e. 71 comprising of cotton (65), tomato (3) and sunflower (1) were received from private sector. Two applications for rice have also been received from public sector (ICAR). Till date, only one variety of tetraploid cotton received from private sector has been issued certificate of registration. Upon receipt of application filed under EDV, if it is found to be

Fig. 3—Major crops (top 10) for which applications were filed by private sector
compliant with the provisions of the Act, the variety undergoes DUS testing as per the method and manner prescribed by the Authority. Majority of applications filed under EDV are transgenic varieties carrying Bt gene as transgenic event. As Bt cotton is the only crop approved for commercial cultivation in India, only transgenic varieties of cotton filed under EDV have undergone DUS testing. In vegetable and sugar crop, backcross method and somaclonal variants have been applied for registration under the Act.

Analysis of Registration Certificate Issued

As of 30 July 2014, 1432 certificates of registration were granted under ‘new’, ‘extant’, ‘farmers’ and EDV categories as shown in Fig 4. Out of 1432 certificates given, 768 certificates were given to public sector mainly, ‘extant notified varieties’. 269 varieties from private sector were also registered under the Act. Farmers’ variety also shares 395 certificates, a major portion of which are for traditional rice varieties. One EDV, of tetraploid cotton, filed by a private seed company has also been registered under the Act. As private sector register their varieties mainly under ‘new’ and ‘extant’ category thus go for DUS testing for two and one year respectively, hence in the coming year, when the DUS test of private sector will get completed, more certificates of registration will be granted to the private sector.

Upon issuance of certificate of registration, the Authority shall publish content of the certificate in the PVJI in the prescribed manner and invite claims of benefit sharing to the variety registered. Upon publication, any person or group of persons or firm or governmental or non-governmental organization shall submit its claim of benefit sharing within a period of six months from the date of such publication in the prescribed manner. Provided the Authority may extend the time limit beyond the period of six months. Upon receipt of any such application, the Authority shall send a copy of such claims to the breeder of registered variety in respect of which benefit is claimed and shall decide the amount of benefit sharing after hearing both the parties accordingly. Till date, the Authority has received very few cases of benefit sharing. One case is of ICAR-Orissa Agricultural University which was settled amicably and there is another case from private sector but it is at the initial stage of processing. Some of the applicants have submitted details of farmers’ variety used in the development of candidate variety and have submitted affidavit for lawful acquisition of farmers’ variety concerned. One of the cases was of bread wheat variety ‘Sanjivani-34’ developed by Basant Agro Tech (I) Ltd using a local farmer variety. Most of the applicants have submitted details of source of parental material, its lawful acquisition certificate and schematic diagram of candidate variety. Generally, the parental material used was stated as in-house germplasm and in case of transgenic, the certificate of lawful acquisition of event concerned and the approval of commercial cultivation of candidate variety from Genetic Engineering Approval Committee (GEAC) is also submitted.

Overall Analysis

- Considering the varieties of economic importance in India, the Authority had notified 79 crops species till 30 July 2014. Several other prioritized crop species are either at the stage of notification (13 crop species) or in the process of development of DUS test guidelines (14 crop species).
- Year-wise analysis of total applications received shows that every year, applications are received from public/private sector and ‘farmers’ varieties
are also filed in unequal proportion. Cumulatively, farmers' varieties top the chart followed by private and public sector respectively. In category-wise analysis, maximum applications are filed under farmers category followed by 'extant' and new category. Private sector prefers to file application under new category both for the hybrids and its parental lines.

- Crop-wise analysis of total applications received during the reporting period shows that maximum applications received is of rice, staple food crop, of which 3036 farmers’ varieties have been filed for registration. From public sector also, maximum number of rice varieties have been filed for registration. In Private sector, maximum varieties filed for registration are for cotton (931 varieties) followed by rice. Wheat, another major cereal, is predominantly the area of focus of research of public sector/SAUs only. Maize is only crop, for which both public and private sector have filed application for registration of new varieties.

- Sector-wise analysis of applications received shows that public sector has actively filed applications for ‘extant’ varieties notified in the Seeds Act, 1966; whereas private sector through its focused approach dominated in cross pollinated crops where new hybrids are being developed through exploitation of heterosis method.

- Private seed industry concentrated in development of high yielding hybrids mainly cotton, vegetables, maize, sunflower and more recently on rice also. The basic reason for the private sector focus on these crops is that it involves low production volume and high margins and is also less prone to piracy. Further as cotton is the first commercially approved transgenic crop in India hence there is scope of further growth. The biggest gain from the Bt cotton was that it result in reduced insecticide usage along with high yield.

- Farmers are custodians of rich agro biodiversity of India. Under PPV&FR Act, a set of rights are granted to farmers called ‘Farmers’ Rights’. It includes right to register their varieties. During the reporting period, although farmers have submitted 3634 applications in 48 notified crop species. However, the major share of this number is concentrated on few crops, majority of which are rice varieties (3036). For rest of the crops, the number of applications received is below 100. This shows that as rice being the staple food crop hence farmers are maintaining its diversity but for rest of the crops, farmers are shifting cultivation from typical to modern high yielding hybrids.

- For the registration of EDV, a separate procedure is adopted throughout the Act. Since 2008, applications were filed under EDV category but during the reporting period, out of 137 applications received, only one cotton variety is registered under EDV category. Rest of them is in various stages of processing. As registration of EDV is a new area, hence criteria and status will improve in future.

- Initially, parental lines were kept as trade secret/know-how. But with the enactment of the PPV&FR Act, both Public and Private sectors are filing applications for parental lines also as they consider it to be safe and provides a mechanism to establish proprietary over their material. It provides a mechanism for legal protection of germplasm and prevents its illegal use in development of hybrids by third party.

- During the report period, 1432 certificates of registration have been issued that grant exclusive right to IPR holder to use it for revenue generation. For the maintenance of registration, the applicant is required to pay annual fee as per Gazette Notification No. 2182(E) dated 26 August 2009. An amount of Rs 2000/- is fixed for all categories of varieties and 0.1-0.2% of sale value plus royalty 0.5-1.0% (if any) is also required to be paid for 'new'/VCK varieties. Since 2009, the Authority is receiving annual fee and till date, approximately 30 lakhs rupees have been generated from the annual fee. The amount of annual fee is deposited in the National Gene Fund constituted u/s 45 and Rule 70 of the Act and is used for the payment of benefit sharing and compensation to village and local communities for supporting conservation and for recognition and award to farmers/farming communities as a support to them for conservation and sustainable use of genetic resources.

- Due to increased population pressure and for nutritional security, the farmers are adopting modern farming practices instead of traditional cultivation. Further, they prefer to grow high
yielding hybrids instead of local varieties. But the lacuna is they continue to use the farm saved seed for further cultivation. Although the high price of hybrid is compensated by the high yield but re-sowing result in in-breeding depression. Thus, farmers are losing the ways, one the one hand, it result in depletion of local varieties and on the other hand, it limits the farm saved seed practices. In the present situation, the right to farm saved seed granted under the Act, is practically ineffective. Hence, policy makers should find solution to such practices and efforts should be made for development of new high yielding typical varieties so that attempt of private sector to monopolise through hybrid seed production in cross pollinated crop species should be checked. Further, to promote agro-biodiversity conservation, farmers should be given some incentives for cultivation of traditional varieties so that biodiversity shall remain maintained which attaining high production and profitability.

Conclusion

Based on the above trend analysis of all the three sectors (public/private/farmer), it can be concluded that public sector is more interested in protecting the varieties in the seed chain i.e. the varieties notified in the Seeds Act, 1966, whereas private sector is gaining competitive edge and prefers to file for IPR protection before release of newly bred variety in the market. Farmers’ predominated over both public and private sectors in filing of applications of rice, which is an important staple food grain. Essentially derived varieties were also limited to few crops and in case of transgenic, applications for Bt Cotton, the only commercially approved crop in India, are only processed for registration. In case of EDVs, major share is of Private sector and the Public sector has filed only two EDV applications of rice. From year-wise analysis of applications received, no clear-cut increasing or decreasing trend is observed. In fact it varies in accordance with notification of crop species. Rule 24.2 also has a major impact on the no. of applications received. A large variation is observed among the breeders of public/private sector and farmers as breeder in breeding approach and the crop species of interest. Both private and public sector are less interested in ornamental plants, fruits, spices, medicinal and aromatic plants and plantation crops. However, new varieties of ornamental crop namely rose and potato a tuber propagated crop is filed by foreign applicants, so as to prevent illegal commercial exploitation by the competitors, as these varieties are commercialised in India through licensing.

With the passage of time, IPR in plant varieties will gain strength and momentum and more and more new varieties are expected from public sector. Private sector will also get involved in breeding of all the notified crop species and will register both typical and hybrid varieties. An increase in number of farmers’ varieties of all the notified crops will also be observed and applications will be received from all the states across India. More new players will also claim IPR for their newly bred varieties and applications for recently notified crops will also show an increasing trend. Thus more number of new high yielding improved varieties will become available in the market and both public and private sector will generate revenues for further investment in R&D and for the rapid growth of agricultural community.

References