

Impacting Research and Innovations of Agricultural Biotechnology Sector

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Abstract

Our Research Paper “Impacting research and Innovations of Agricultural Biotechnology Sector” is a Agrarian biotechnology area in India, especially its plant biotechnology section, is remarkably ready for a significant course of change. As the country's horticultural biotechnology area gained ground during the 1990s in rDNA, transgenics and atomic marker helped plant reproducing measure, the Government of India reacted with a coordinating with strategy support and administrative system that was intended to deliver the way of progress in R&D, economical and bio-safe. Generally, advancements in the arrangement front have been actuated by an energetic non-legislative area that seriously mediated on the sensitivities of present day biotechnology. This paper examines examination of the issues and continues to additionally consider the way of progress accomplished by agrarian biotechnology organizations in India in the space of commercialization of biotechnology items. The uncommon focal point of this paper is on plant biotechnology.

Introduction

Agrarian biotechnology area in India, especially its plant biotechnology fragment, is particularly ready for a significant course of change. As the country's horticultural biotechnology area gained ground during the 1990s in rDNA, transgenics and atomic marker helped plant rearing cycle, the Government of India reacted with a coordinating with strategy support and administrative system that was intended to deliver the way of progress in R&D, practical and bio-safe. Generally, advancements in the approach front have been prompted by a lively non-legislative area that seriously mediated on the sensitivities of present day biotechnology. This paper examines investigation of the issues and continues to additionally consider the way of progress accomplished by farming biotechnology organizations in India in the space of commercialization of biotechnology items. The uncommon focal point of this paper is on plant biotechnology.

The form 1986 to 2002 it is assessed that the Government of India contributed a measure of US\$ 275 million in the biotechnology area. The Government of India has additionally broadened investment support for biotechnology new businesses through the Technology Development Board and the New Millennium Indian Technology Industry Leadership Initiative (NMITLI). In the interim the States of Andhra Pradesh, Karnataka, Maharashtra, Gujarat, Kerala and Tamil Nadu have drawn up eager sub-public biotechnology arrangements, which guarantee monetary and foundation support measures to imminent business visionaries. Some State Governments have dispatched their own endeavor assets for supporting novel beginning up adventures.

Farming biotechnology area in India, especially its plant biotechnology fragment, is interestingly ready for a significant course of change. As the country's agrarian biotechnology area gained ground during the 1990s in rDNA, transgenics and sub-atomic marker helped plant rearing cycle, the Government of India reacted with a coordinating with strategy support and administrative system that was intended to deliver the way of progress in R&D, economical and bio-safe.

Generally, advancements in the strategy front have been incited by an energetic non-legislative area that strongly mediated on the sensitivities of current biotechnology. This paper talks about examination of the issues and continues to additionally consider the way of progress accomplished by farming biotechnology organizations in India in the space of commercialization of biotechnology items. The uncommon focal point of this paper is on plant biotechnology. The form 1986 to 2002 it is assessed that the Government of India contributed a measure of US\$ 275 million in the biotechnology area.

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To catalyse the cycle, the Government of India agreed need to IPR insurance. The Indian Patents Act of 1970 was changed to accommodate item licenses for agro-synthetics, medications and drugs and microorganisms over a brief period. An item patent system would be set up in India by January 1, 2005.

The new patent law broadens security term for innovations from 14 to 20 years. To accommodate insurance of IPRs in regard of new plant assortments, Parliament has authorized a sui-generis enactment looking like the Plant Varieties Protection and Farmers Rights (PVFR) Act in 2001. These advancements have made good lawful conditions for global associations in biotechnology R&D. By focusing on FDI interests in biotechnology, the Government of India has conveyed proper messages to global financial backers.

Further the way that these progressions have been in consonance with the WTO-TRIPs has loaned more prominent respectability to these changes. In the meantime, the Government has likewise gotten guidelines over horticultural biotechnology. Aside from the biosafety guidelines that structure part of the Environment (Protection) Act 1986, the Indian Parliament has enacted the National Biodiversity Act in the year 2002, to accommodate administrative powers over admittance to natural assets in India.

IPR Regimes for Plant Biotechnology

Article 27(3) of the TRIPs Agreement sets out that individuals will accommodate the security of plant assortments either by licenses or by a powerful sui generis framework or by any blend thereof. Article 27(3) specifically is basic to India as this expects us to give assurance of plant assortments by giving plant raiser's freedoms either via licenses or through sui generis plant assortment security enactments. Nations with solid R&D base in plant hereditary designing, for example, USA have powerful Plant Utility Patent Legislations. India is positively not leaned to embrace patent assurance systems for its plant assortments. India is somewhat disposed to embrace a sui-generis enactment which is non-'patent' based. There are many purposes behind this proclivity. India is one of the ten uber variety nations of the world and a rich storage facility of landraces of head farming yields. India has a solid R&D base in regular plant reproducing techniques. Its solidarity in plant hereditary designing is noteworthy yet not a staggering variable by correlation. The initial two qualities clarify India's reluctance towards plant patent systems or towards a sui-generis enactment which is 'patent' driven. While Plant Utility Patents Act provide for broad patents over plant varieties, traits and genes and even the physical parts of the plants, plant breeders rights provide for IPR only over varieties. As is well known, since 1990s the UPOV (Union for the Protection of Varieties) has been largely viewed by developing countries as offering the best regime for positioning their national legislations.

The central feature of the UPOV is the protection it affords to plant breeders who produce plant varieties that fulfil the criteria of distinctiveness uniformity and stability (DUS). The current version of the UPOV, viz. UPOV 1991 had added additional criteria of 'new' to DUS thus rendering DUS as NDUS. Contrary to the popular notion, the NDUS criteria of UPOV 1991 is not substantively different from the principles of 'novelty', 'inventiveness' and 'industrial application' (NII) which applies for patents. The criteria of 'novelty' and 'inventiveness' in Patent Laws are covered by the criteria of 'new' and 'distinct' in UPOV 1991. Thus by distinctness, the UPOV means a variety of plant which is 'clearly distinguishable from other varieties whose existence is a matter of common knowledge'.

It is apparent that this term captures the attributes of 'novelty' and 'inventiveness' implicit in Patent Laws. Even in respect of 'uniformity' and 'stability' criteria the UPOV does not offer different recipes. True, by 'stability', the UPOV conveys that 'relevant characteristics of protected plant variety remain unchanged either for a specified period or after repeated propagations or cycles of propagations'. It is also true that 'stability' is a difficult criterion for a plant breeder to fulfil. Attainment of 'stability' criterion is problematic for cross-pollinated plants and non-single homozygous lines of autogenous plant varieties. This, in turn, reduces the commercialisation potential of the plant variety since inconsistency of genetic quality jeopardises commercial application of the plant variety. The same holds true of the criterion of "uniformity". Therefore, the NDUS criteria of UPOV 1991 are homologous to the NII criteria implicit in Plant Utility Patent Laws.

While Plant Utility Patents Act accommodate expansive licenses over plant assortments, attributes and qualities and surprisingly the actual pieces of the plants, plant raisers freedoms accommodate IPR just over assortments. As is notable, since 1990s the UPOV (Union for the Protection of Varieties) has been to a great extent saw by emerging nations as offering the best system for situating their public legislations.

The focal component of the UPOV is the insurance it bears to establish reproducers who produce plant assortments that satisfy the rules of uniqueness consistency and solidness (DUS). The current rendition of the UPOV, viz. UPOV 1991 had added extra rules of 'new' to DUS in this way delivering DUS as NDUS. In spite of the well-known thought, the NDUS measures of UPOV 1991 isn't considerably unique in relation to the standards of 'curiosity', 'innovativeness' and 'modern application' (NII) which applies for licenses. The standards of 'oddity' and 'creativity' in Patent Laws are covered by the models of 'new' and 'particular' in UPOV 1991. In this manner by uniqueness, the UPOV implies an assortment of plant which is 'obviously discernible from different assortments whose presence involves normal information'.

It is obvious that this term catches the traits of 'oddity' and 'innovativeness' certain in Patent Laws. Indeed, even in regard of 'consistency' and 'steadiness' standards the UPOV doesn't offer various plans. Valid, by 'solidness', the UPOV passes on that 'significant attributes of ensured plant assortment stay unaltered either for a predefined period or after rehashed proliferations or patterns of spreads'. It is likewise a fact that 'steadiness' is a troublesome model for a plant reproducer to satisfy. Achievement of 'steadiness' standard is tricky for cross-pollinated plants and non-single homozygous lines of autogenous plant assortments. This, thusly, lessens the commercialisation capability of the plant assortment since irregularity of hereditary quality imperils business use of the plant assortment. Similar remains constant of the measure of "consistency". In this manner, the NDUS models of UPOV 1991 are homologous to the NII rules implied in Plant Utility Patent Laws.

IPRs and investments in plant biotechnology

The implied reasoning for IPR security is that they advance interests in plant rearing and bio-designing. This speculation is challenged by part of examiners. In any case it's obviously true that the construction of IPRs do impact speculations. IPRs actuate their own example of advancements. The time taken for R&D to fructify as developments is a pivotal viewpoint directing speculations. Frequently IPR systems assume a vital part in affecting the time example of innovations.

It is a verifiable truth that traditional plant reproducing strategies are tardy and tedious. It expects 7 to 8 ages of continued rearing to decrease heterozygosity of new genotypes. As Vasan (1985) notices Arabica Coffee subject to three to four patterns of rearing actually show heterozygosity and it isn't until 20 to 25 years (traversing 4 to 5 ages) that one shows up at genuine reproducing assortments. This delay is considerably more articulated for the Robusta espresso assortment (between explicit crossover of Arabica and Robusta Coffee) where isolation of ominous attributes could in any case happen even after a few ages of backcrossing and selling.

The delay in arrival of plant assortments satisfying the rules of curiosity, uniqueness, consistency and dependability (or then again the necessities of oddity, imaginativeness and business application)

raise crucial issues from the view-point of capital speculations. The delay in varietal discharge is conceivably least on account of transgenic and non-physically delivered assortments while for conventional or traditional strategies the delay can be greater.⁶ The UPOV 1991 based plant IPR systems could incite longer delays when contrasted with the circumstance when an IPR system depends on the 1978 adaptation of the UPOV. This is because of the way that the base hereditary distance idea certain in UPOV 1991 blocks 'close cousin' assortments from gaining insurance privileges, except if the procedures of hereditary distance assurance without anyone else are deficient.

UPOV 1978 would work with capital speculations somewhat as the arrival of plant assortments is intermittently more regular. Considerably under the plant patent systems, speculations could achieve transient returns, however the volume of ventures should be bigger by virtue of capital force of cutting edge plant hereditary designing advances. By correlation, UPOV 1991 system is least helpful for capital ventures as plant assortment deliveries can be agonizing under this system. Hence food of customary plant rearing under UPOV 1991 systems, must be guaranteed by imbue ment of low markdown capital.

Given the linkages between plant reproducing and the seed business these unreasonable speculation conduct patterns can deliver major financial outcomes. The Seed Laws in different nations, both progressed and creating, are becoming dynamically arranged towards confining business sector course to assortments that are met with plant reproducer or patent privileges. The UPOV rules on DUS are utilized worldwide not just as the reason for building up varietal peculiarity and portrayals yet in addition for seed affirmation purposes.

The DUS rules are utilized for perceiving and enlisting not just the 'fundamental' seeds utilized for increase of 'family' seeds yet in addition for affirmation of the family seeds themselves.⁸ Evenson (1991) clarifies how nonappearance of IPR freedoms will diminish Marginal Variable Costs (MVC) of seed duplication. Harder controls by confirmation of seeds could guarantee that seed supply is kept in a 'choked mode' and MVC of seed increase are raised. This thusly, will create its own stockpile request elements as Figure I depicts.

Figure I: Supply-demand dynamics for seeds in different IPR regimes



Sort I draws out the ramifications of IPR systems as far as the stock bends for seeds. As Figure I shows that in a circumstance of 'liberal' plant assortments insurance laws (which don't accommodate hereditary distance) and similarly liberal 'seed laws' which license non-enlisted assortments (counting landraces) to be sold in open business sectors, the large scale supply bend of seeds will be versatile (S1). At the point when these systems shift towards 'hereditary reliance' PBR systems and more tight seed laws that disallow advertising of non-enrolled assortments, the stock bend will more often than not be generally inelastic (S2). Similarly, request bends could move from D1 (wherein interest for ensured assortments will be versatile because of accessibility of landraces and non-secured assortments in the business sectors) to D2 (where the interest for the secured assortment will be inelastic by virtue of restriction at a bargain of landraces and other non-secured assortments).

In the D1-S1 circumstance, supply limitations and request adaptability could actuate low value systems while in D2-S2 the opposite circumstance would happen. D2-S2 circumstance isn't attractive for nations like India for different reasons also. The experience of momentary economies of East Europe, which had re-displayed their Seed Laws in similarity with European Community Seed Laws, has been tragic. Ranchers of the East European alliance developing and rationing landraces have been unfavourably impacted by new seed laws, which by denying exchange non-enlisted assortments not satisfying the DUS standards have added to the disintegration of landraces in these nations. It is along these lines clear that agro-biodiversity can be unfavourably impacted by the consistency rules of DUS, which achieves resultant changes sought after and supply position of seeds.

Post R&D regulations and investments

Post-R&D regulations play a critical role in deciding on the pace of investments in the biotechnology area. Regardless of whether a beginning up big business partakes in a positive IPR system, that remunerates its innovations, it is impossible that it will put resources into item advancement, in the event that post-R&D guidelines are inflexible and tardy in nature. This then, at that point, shapes the background for vital collusions between fire up adventures and downstream modern complexes.

Multi-layered guidelines in the post-R&D stage include intricacies which are communicated in the postponements in business application/use of developed items or technologies.¹⁰ For the situation of third era plant biotechnologies, for example, transgenics, the issue is compounded by the way that guidelines without help from anyone else are perplexing and less comprehended by the controllers themselves.¹¹ A transgenic plant would need to go through multistage administrative checks and clearances prior to finding business application.

India is interestingly arranged, taking everything into account. In the space of plant biotechnology, propels have been made in transgenics of rice and wheat conveying pressure open minded qualities like Coda, COR47 and HVA1. The bigger test is to take these items through the administrative cycles. More impressive is the issue of market advancement and proper estimating of transgenic seeds. There are numerous imponderables here. Pieces of the pie for seeds in India have fluctuated from one harvest to another and from one district to another. The 'interest' for transgenic plants or seeds might be significantly more dubious, given the 'security' aspects and hazard avoidance inclination of Indian ranchers. In the dry agrarian pockets of Central and South India, ranchers will

generally be joined to customary dry season tough assortments of plants, which thusly adds to their underlying 'idleness' to move to transgenics.

To summarize, India's rural biotechnology industry has the important strategy and administrative help to advance dynamic R&D. Be that as it may, in the basic space of item improvement and commercialization substantially more consideration should be paid. The multi-layered administrative structure that exists could truly influence the exhibition of new businesses that might want to go through the whole life-pattern of biotechnology item advancement. Thus, organizations and vital collusions ought to be energized between fire up adventures and set up organizations that have high item advancement capacities. The experience of different nations in the Asia Pacific area could be a key contribution to outlining improvement systems for biotechnology items in India.

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