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PLANT BREEDERS RIGHTS AND FARMERS RIGHTS IN WTO FRAMEWORK: CHANGES IN SEED POLICIES AND LEGAL FRAME WORK IN INDIA

Dr Pulapalli Venkataramana
Government Degree College, Chevella, Telangana State

INTRODUCTION

The Government of India declared seeds as an essential commodity under the Essential Commodities Act, 1955. The Indian Seed Act, 1966 provided a general policy and institutional framework for supply of seeds to agriculture. The basis objective of the Act is to regulate the quality of seeds and notify various varieties of seeds by the central government with clear certification. At the state level, various State Seed Certification agencies are authorised with rigorous seed standards through complex field inspections and laboratory testing. Thus the seed production and supervision had been mostly done by the public sector. There could also be private sector seed companies earlier with insignificant role. Hence, the government of India has brought out a penalty provision under the Essential Commodities Act. Under clause 'BC Accordingly, Seed Control Order 1983 was promulgated and that came into effect from July 1, 1994 after prolonged legal challenges by seed dealers associations. In accordance with the provisions of the Seed Act 1966, Central Variety Release Committee (CVRC) is to be constituted for approval of seed varieties and cultivars. Inspite of these measures, there had been persistent shortage of seed varieties resulting in dearth of food grains in the country during 1960s. This has forced the government to adopt the New Agricultural Strategy (NAS) with High Yielding Varieties of Seeds. As a part of this strategy, production and distribution of seed varieties were undertaken by the public sector. Thus the public sector seed industry was the major player which undertook breeding and multiplication. During the early decades, the presence of private sector was negligible.[1]

In the later years, due to depletion of ground water and increase in the extent of cultivable land, non-food crops were encouraged, particularly the dry land areas had initiated crops like cotton, groundnut, maize, chilli etc. These crops are known as Identified Dry (Id) Crops. However, the public sector could not adequately cater the hybrid seed varieties for this phase and private sector was encouraged. The government has formulated the New Policy on Seed Development 1988 (NPSD) and thereby liberalized regulations on imports and exports of seeds and Foreign Direct Investment (FDI) in seed Sector. Under the New Policy on Seed Development, import of seed, planting material of vegetables, flowers, ornamental plants and fruits are kept under Open General Licence (OGL). This policy gave boost to private seed sector in terms of Research and Development and Intellectual property Rights. The Policy facilitated the entry of multinational Corporations (MNCS) into the domestic seed industry. Later, the government of India brought out Seed Act in 2000 and the provisions of which are reiterated in the National Seed Policy in 2002. This Act is revised in 2004 and was formulated in consonance with the Government of India stand regarding the Trade Related Intellectual Property Rights agreement of WTO. This Act was aimed

to not restrict the farmer to save, use, exchange, share or sell his farm seeds except that they should not be sold under commercial brand name. For the first time, this Act made the registration of plant varieties or seed varieties compulsory. In fact, the government of India has recognized the need for a separate legislation for protecting the Rights of the farmers based on 'Sui Generis' System.

Plant Varieties Protection And Farmers Rights (PPV & FR) Act, 2001:

Under section 27(3)(b) of the Agreement on Trade Related Intellectual Property Rights (TRIPs) of WTO, member countries are required to protect plant varieties either by patents or by an effective 'Sui Generis' System of protection or by a combination of both these systems. India has opted for protection of plants based on 'Sui generis' system and brought out the legislation as 'Protection of Plant Varieties and Farmers' Rights (PPV & FR) Act 2001. The Act is meant to protect the germ plasma of any new plant variety if the novelty, distinctiveness, uniformity and stability (NDUS) criteria are satisfied. An important feature of the Indian Act is that it allows farmers to save, sow and sell seeds even for a protected variety.[2]

The "Plant varieties protection and Farmers' Rights Act (PPVF R Act) is the first legislation of its kind that simultaneously recognizes and rewards the contributions varieties. This concept is in conformity with the provisions of convention for Biodiversity and provisions of Food and Agriculture Organization Treaty. It satisfies the need for enacting a Sui generis legislation for protecting the Intellectual Property Rights of plant breeders stipulated under the WTO Agreement in Agriculture. The Right conferred in the plant varieties protection (PVP) is also called Plant Breeders' Right (PBR) with farmers' privilege. This means that a farmer shall be entitled to save, sow, re sow, exchange share or sell his farm produce including seed variety of protected germ plasma. However, the farmer is not entitled to sell branded seed of a variety protected under this Act.[3]

The PPVFR Act envisages the establishment of an Authority as protection of Plant varieties and Farmers' Rights Authority. This Authority became operational since 11 November, 2005. The objectives of the authority under Clause 22 and 45 of the Act, 70(2)(a) of PPV & FR Rules 2003 and PPV & FR (Recognition and Reward from gene Fund) Rules, 2002, are the following:

Establishment of an effective system for protection of Plant Varieties, the rights of farmers and plant breeders and to encourage development of new varieties of plants.

Recognition and protection of the rights of farmers in respect to their contribution in conserving, improving and making the available plant genetic resources for the development of new plant varieties.

An accelerated agricultural development in the country by stimulation of investment for research and development both in public and private sectors.

Facilitate growth of seed industry to ensure the availability of quality seeds and planting material to the farmers.

The PPV & FR Authority shall maintain a National Register of Plant Varieties. The Certificate of Registration shall be valid for a minimum of 6 years to a maximum of 18 years. It also provides for compulsory licensing to meet the reasonable requirement of the public for seeds and other propagating material. The PPV FR Act 2001 is considered to be a model Act for Developing Countries and the Least Developed Nations.[4]

Plant Breeder Rights and Farmers Rights:

From time immemorial, many farmers, farming communities, tribes and rural families are breeding plant and seed varieties in India. These communities are contributing for conservation of genetic diversity and selection of plants and animals for domestication. In some places, these breeders are also worshipped with temples.[5] This is why even the World Intellectual Property Organization (WIPO) has agreed to recognize the Intellectual Property Rights of Communities that have not only conserved biodiversity but also added value through selection and identification of the seed and plant properties of economic value.

However, during the second half of the 20th Century many industrialized nations encouraged investments in seed sector and this resulted in the emergence of commercial plant breeders and Multinational Seed Companies. Subsequently the Union for the protection of New varieties of Plants (UPOV) which has its Headquarters in Geneva along with WIPO strove to strengthen the IP Rights of Primary Conservers (Fanners and Tribesmen) and Commercial Plant Breeders. This matter was also debated in Food and Agriculture Organization (FAO) and India, along with Mexico and other countries moved a resolution in 1981 emphasizing the protection agro biodiversity heritage and IPRs of Communities. As a result, a Commission on Plant Genetic Resources was set up by the Indian Government with noted food Scientist Dr M.S. Swaminathan as its Independent Chairman. Deliberations in this Commission led to the emergence of Farmers' Rights. This concept is considered as a Collective right as the Community itself is involved in the conservation of agricultural plant diversity. This concept is incorporated in Article 9 of the International Treaty on plant genetic resources for Food and Agriculture of the FAO (FAO Treaty) which came into force on July 29, 2004. However, the concept of Farmers' Rights did not find ready acceptance among most developed countries and multinational seed companies. To resolve this disagreement, certain Research Institutes (such as Keystone Centre in Colorado, USA and MS Swaminathan Research Foundation MSSRF, Chennai) convened a series of multi stakeholder dialogues during 1989-91. Major multinational seed companies participated in this dialogue and a consensus is evolved with a statement on Farmers' Rights (as follows).

"Farmers Rights, a concept which has been developed and adopted in FAO recognizes the fact that farmers and rural communities have greatly contributed to the creation, conservation, exchange and knowledge of genetic and species. The utilization of genetic diversity, this contribution is ongoing and not simply something of the past and that this diversity is extremely valuable. Local communities bear much of the burden of protecting germplasm and the rest of the world has an obligation to help them carry out this task and help them in utilizing the material. Yet neither the market place nor current intellectual property systems have any way of assigning a value to the valuable material. No compensation or reward mechanisms exist".

This is known as Chennai consensus and this paved the way for benefit sharing provisions of the Convention on Biological Diversity (CBD) adopted at the Earth Summit at Rio de Janeiro in 1992 which gives explicit recognition to the rights of primary conservers. This Chennai draft has provided the basis for the adoption of "Plant Varieties Protection and Farmers^ Rights Acts" (PPV & FR Act) by the Indian Farmers

The Indian Act recognizes the multiple roles of farmers - as Conservers, Cultivators and breeders.

As cultivators the farmers' have the rights to keep and plant their own seeds (plant back rights)

As breeders, the farmers have the rights as commercial breeders

As conservers, the farmers have the rights to get recognition and reward from National Gene Fund.

Clause 5 of the PPV & FR Act recognized the farmers and plant breeders rights in matters of seed developing. According to this clause, "farmers rights are to be provided in order to protect the rights of the developers of new varieties to stimulate investment in plant breeding and to generate competitiveness in the field of research and development both in public and private sectors with the ultimate aim of facilitating access to newly developed varieties and maximizing agricultural production and productivity in the country — protection of farmers and researchers rights will strive to balance the need for stimulation and incentive to R & D with Welfare of farmers.[6]

Likewise, Clause 22 of the PPV & FR Act clearly states the nature and scope of Farmers Rights and Plant breeder's rights. It states that in "recognition of the contribution by rural communities with sustained perseverance in development, on farm innovations, enrichment and conservation of plant genetic resources rewards and or compensation to such communities or clusters such that rural communities may have a stake in and continues their efforts at preservation and improvement of land races. In recognition of their contribution in ensuring conservation, improvement and availability of plant genetic resources," farmers are to be given rights to secure foil benefits and support in continuation of their contribution. A farmer is provided "__additional rights to dispose of his farm produce as he chooses which includes his right to save, use, exchange, share and sell propagating material or seed obtained or descended from seed obtained of protected variety except sale of branded seed/propagating material—".[8]

Thus, the Protection of Plant Varieties and Farmers' Rights Act (2001) prescribes the farmers having rights to a) save the seeds b) use the seeds c) exchange the seeds d) share the seeds e) sell the seeds or propagating material f) sow seeds and g) re sow seeds.

The Plant Breeder Rights (PBRs) are to include a) Production or reproduction (multiplication) b) conditioning for the purposes of propagation c) offering for sale d) selling or other marketing e) exporting f) importing and g) stocking for any of the purposes referred above.

Though the PPV & FR Act explicitly defines the rights of the farmers and plant breeders, there has been a lot of criticism against this Act. For instance, this Act views the farmers' established varieties as traditional Cultivars which will not be granted any protection. In general, farmers are seen as cultivators and managers of agro-biodiversity but not as breeders. Clause 17 of the Act states that, "Nothing shall affect the farmers' traditional rights to save, use, exchange, share and

sell his farm produce of the protected variety except sale for reproductive purpose under commercial marketing arrangements".[9]

However, some associations are optimistic that PPV FR Act will balance the rights of farmers and Plant breeders. R.K. Sinha, Executive Director, All India Crop Biotechnology Association (AICBA) has opined that this legislation protected the Rights of Farmers to save, use, sow, re sow, exchange share or sell his farm produce including seed variety. At the same time, it also secured the Rights of the Communities for their efforts in development of the varieties. Thus a balance was struck in the rights of the individuals and communities.[10]

Scholars like Mike Adcock criticized the Indian PPV & FR Act (2001) that the Farmers Rights stated in this Act fall short of the Farmers privilege which allows the farmers to continue their tradition of using a part of one year's harvest as seeds for the next year and also exchange seeds with their farm neighbours. He has understood the farmer's rights as to save seeds for replanting on their own holding.[11]

ROLE OF MULTINATIONAL CORPORATIONS:

As a result of successive policy changes, India's seed industry has expanded substantially. In the initial decades of independence, the Indian Council of Agricultural Research (ICAR) and the state agricultural Universities have developed and improved crop varieties and hybrid seeds. The stage of multiplication is also done by public sector seed agencies like the National Seed Corporation (NSC), State Farm Corporations and 13 State Seed Corporations. The Public sector has played a vital role by producing low value and high volume seeds like High Yielding Varieties (HYV) in food crops that could achieve self-sufficiency in food security sector in India. The private sector has emerged since 1980s and has widely expanded itself into big indigenous companies along with multinational companies. These companies are functioning individually and with collaborations. Private Companies produce seeds by indenting for breeder seed and then multiply into foundation seed. While the public sector seed companies are mostly confined to the varieties of wheat, rice, pulses and cotton seed markets, the private sector has made inroads into vegetable hybrids, sorghum, pearl millet, maize, cotton and some rice varieties. Multinational seed companies like Monsanto (US), Cargill (US), DuPont (US), Syngenta (Switzerland), Groupe Limagrain (France), Bayer Crop Science (Germany) Ciba-Geigg and Takil (Japan) etc are actively operating in India.

World's Top Seed giants and their proprietary over seed markers are as follows (which includes their turn over);

S. No.	MNC	Turn Over	Percentage of Market turnover (%)
1	Monsanto (US)	4.9 bn $	23
2	Dupont (US)	3.3 bn $	15
3	Syngenta (Switzerland)	2 bn $	9
4	Groupe Limagrain (France)	1.2 bn $	6
5	Land 'O' Lakes (US)	917 m $	4
6	KWS AG (Germany)	702 m $	3

7	Bayer Gop Science (Germany)	524 m $	2
8	Sakata (Japan)	396 m $	< 2
9	DLF – Trifolium (Denmark)	391 m $	< 2
10	Takil (Japan)	347 m $	< 2
	Total of top 10 seed companies	14.785 bn $	6.7

(Source: Down to Earth, August 16-31, 2010)

Likewise, these Multinational Seed Companies are holding significant number of patents. For instance Monsanto holds patents on 173 varieties totaling 8 per cent, Syngenta holds 205 patents with 9 per cent, DuPont/Pioneer holds 184 patents with 8 per cent and Aventis holds 55 patents with 2 per cent of total patents on seed varieties. This has led to large scale commercialization of seed markets. This type of commercialization of seeds has led to debates and disputes relating to the price control and regulatory mechanisms on quality seeds. Moreover, the seed production of MNCs is more than 75 percent in crops like Cotton, Sorghum, Maize, Pearl Millet and Sunflower. Hence, there has been excessive dependence on MNCs in these mentioned crops. The seed Bill (2010) aims to "provide for regulating the quality of seeds for sale, import and export and to facilitate production and supply of quality".[34] However, a note circulated by the agriculture ministry has categorically stated that the bill does not envisage any "provision for price control" and is intended to regulate the quality of seeds. Congress ruled Andhra Pradesh is the biggest opponent of the bill and its agricultural Minister N. Raghuveera Reddy has been campaigning ceaselessly for significant changes in the proposed law. The Andhra Pradesh Agriculture Minister is of the opinion that "States must have the power to fix the price of seed and trait value (the royalty paid on patented seeds) wherever necessary. He has suggested that an independent authority to oversee the prices fixed by seed companies. Otherwise, the seed companies will squeeze the farmers. In fact, Andhra Pradesh has been playing a lead role in fight for regulated seed prices in the country. Since 2006, it has been taking on the US Biotech giant Monsanto on the issue of Trait fees (or Royalty for patented seeds) that charges for its genetically engineered Cotton Seeds (sold as Bollgard and Bollgard II). The AP State says that the trial fees charged by Monsanto's marketing arm in India, Mahyco Monsanto Biotech (India) Limited are predatory and monopolistic.

The Andhra Pradesh government is insisting on a standard formula for royalty rate (on patented seeds) in the seed bill which should not be more than 20 percent of the cost of the bare seed for the first three years and 5 percent for the subsequent period.[12]

On the quality front of the seeds, there have been reports of failure of maize seeds in Bihar and Bt Cotton Seeds in Maharashtra and Andhra Pradesh. These losses amounting to hundreds of crores of rupees to Indian Farmers.[13] In fact, the state governments in India are using the Essential Commodities Act (1955) for quality control. But this Act became inadequate and the AP State Government has entered into an MOU with private seed companies in 2002 which emphasizes on compensation for seed failure.

In spite of having criticism on the role of Multinational companies on price and quality fronts, studies indicated that the combination of supportive policy changes and enforceable Intellectual

Property Rights (IPRs) encouraged greater private investment on hybrid crop improvement and ultimately led to increase in yield levels.[14]

The Operational domain of Multinational Corporations has widened with acquisitions, mergers and tie ups with local seed companies. For instance, the Monsanto India has tied up with Mahyco Ltd. Likewise a new seed company, the Nuziveedu seeds (established as a local industry in 1973) has made acquisitions of Pravardhan Seeds and Yaganti Seeds in 2010 Prabhat Agro Biotech Ltd in 2011. In other words, the dependence of farmers on MNCs is slowly increasing with the induction of Hybrid seed varieties.

RESEARCH AND DEVELOPMENT:

India has a well-organized public sector seed research and development system with Indian Council of Agricultural Research (ICAR) as an apex organization. This organization sponsors, coordinates and promotes plant breeding and genetic research in India. The Research and Development System of ICAR includes 53 Central Institutes, 32 National Research Centres, 12 project Directorates and 62 All India Coordinated Research Projects. For Higher Education and Research in Agriculture, there are 39 State Agriculture Universities, One Central University for Agriculture (Imphal) and four deemed Universities in India. Further, India has a strong Seed Certification and quality control system with National Seeds Corporation and State Farms Corporation of India (SFCI), 14 State Seeds Corporations, 19 State Seed Certification agencies and 63 notified State Seed Testing Laboratories. The Public sector Seed Research and Development System in India has developed nearly 3700 HYV of different varieties till 2007. Among them, varieties on cereals (26 percent), legumes and pulses (16 percent), millets (15 percent), oil seeds (14 percent) and fiber crops (7 percent) are significant. Further, the Indian Research has also developed 654 varieties of vegetable crops amounting to 18 percent of new varieties notified. Realizing the importance of plant genetic resources, the ICAR has established the National Bureau of plant genetic Resources (NBPGR) in 1976. The High Yielding varieties and Hybrids developed by India are cultivated in many countries of the world. India has the distinction of developing the Pearl Millet, Mango, cotton, cashew nut and grapes hybrids in the world.[15] The public sector Agricultural research has yielded great results with over 3000 varieties of Hybrid seed varieties. The Kalyan Sona Wheat variety, Jaya rice variety, Samba massuri - Swarna - PR106, Jyothi - IR64 varieties of rice have received wide acclamation both at the national level and global level.[16]

Likewise, the private sector seed companies in general and Multinational Corporations in particular have also developed various Hybrid varieties in Maize, sunflower and cotton. The share of private sector in Research and Development is consistently increasing. With the increase in research and Development by the private sector in seed industry, the multinational corporations file applications for patents on major varieties of seeds and plants. The present TRIPs regime is conducive for free trade and the Hybrid Seeds generated by the private sector are recognized for their trait loyalties on patents. This has led to monopolization of Hybrid plant varieties. At times, the private sector companies exploit the native genetic resources and are resorting to Biopiracy.

Cases of Biopiracy in varieties such as turmeric, neem, basmati etc are challenged by sensitive citizens and NGOS along with ICAR.[17]

Genetically Modified Varieties (GM) - Technology Transfer:

The development and diffusion of Technologies became a critical component in global economic growth. In fact Article 4(5) of United Nations Framework Convention on climate change (UNFCC) makes it imperative to "Developed Countries to take all practicable steps to promote, facilitate and fiancé, as appropriate, the transfer of, or environmental sound technologies and know how to other parties, particularly developing country parties to enable them to implement the provisions of the convention". Accordingly, various Conference of Parties (CoP) suggested plans such as the Bali Action Plan 2007 for technology transfer. India, understands the debate as "a fair, equitable and transparent global regime for technology transfers"[19].

Taking advantage of the demands for Technology transfer, certain seed Companies have entered into Indian market with new seed varieties known as Genetically Modified (GM) technology seed varieties. These Multinational Companies include the Monsanto India, Pioneer Overseas Corporation, Dow Agro Sciences and Syngenta biosciences. There have been many arguments both in favour of and against to technology transfer. Seed varieties like bt cotton, GM Maize and so on are tested and some of them are release. The Government has constituted "Genetic Engineering Appraisal Committee" (GEAC) and various representations are presented by the Industry and farmers associations, concerned citizens and NGOs. The GEAC received applications from seed industries from Biosafety field trials (BRL-I and BRL-II). These applications are for conducting field trials on Rice and Cotton (Bayer Company), castor (directorate of Oil Seeds Research – DOR), Cotton and Maize (Dow Agro sciences), (Central Potato Research Institute), Rice (JK seeds), Corn (syngenta – BRLI), Flex Cotton (Mahyco), Maize (BRL-I), Monsanto and so on. In fact, the Association of the Biotechnology led Enterprises (ABLE-Ag) is believed to have been making powerful influence on the apex regulator, the Genetic Engineering Appraisal Committee (GEAC). These seed industries are conducting trials for insect resistant and herbicide tolerant trials known as Biosafety Research Level Trial (BRL) I and II. This lobby argues that GM material increase production and productivity and save marginal farmers from the high cost of agriculture[20]. However, a strong opposition is also crystallized against the GM crops by certain Non-Governmental Organizations (NGOs) and Civil Society Organizations (CSOs). These include, Centre for sustainable Agriculture led G.V. Ramanjaneyulu, Alliance for Sustainable and Holistic Agriculture (ASHA) led by Kavitha Kuruganti, Deccan Development Society led by P.V. Satheesh, Greenpeace India, Thanal and Kheti Virasat Mission and so on. These organizations strongly feel the need to observe biosafety regulations before allowing GM material. In fact, the Biotech Industries demand strict adherence to WTO agreements on TRIPs and minimize the time for processing application and set time limit for issuing permit letter, besides, acceptance of laboratory biosafety data from overseas, use of imported germplasm for field trials in India, deregulation of certain procedures for seed production. These demands are opposed by the NGOs and CSOs fighting for sustainable agriculture. According to G.V. Ramanjaneyulu (centre for sustainable Agriculture) while data from any lab following sound protocols can be accepted, it is important to see that GM material used is produced in the Country where it is going to be released.

Kavita Kuruganti comments that "in a situation where regulatory regime is already riddled with conflicting interests, it is objectionable that GEAC allowed industry bodies to make a case for themselves".[21] On the other hand, the GEAC that accords permission for GM crops feels that agriculture is a state subject, so the provision for no objection certificate came about to give them a say. The co-chairman of GEAC Arjula Reddy says, "There may be unintended delays but that is the rationale of the job and the trials coming up these days for approval are mostly for food crops like maize and fruits". He also makes it clear that GEAC has to be extra cautions. Sensing the dangers in giving approvals to certain GM Crops, the Government of India has formulated the Biotech Regulatory Authority of India Act in 2012. In the light of these developments, another organization known as Foundation for Biotechnology Awareness and Education (FBAE) headed by a biotechnologist Chavali Kameshwar Rao argues that vested interests are misleading the public media and policy makers. In his opinion, Biotech Crops Undergo rigorous safety assessments following international and national guide times and no verifiable cases of harm have occurred.[22]

The TRIPs agreement of WTO insists upon having flexible atmosphere for research and field trials. Accordingly the noted multinational seed companies like Bayer, Monsanto, Syngenta, pioneer and others have applied for approvals for GM crops. There are allegations that media such as Times of India is engaged in paid news sponsored by Monsanto in reporting the success stories of farmers in Maharashtra. The Hindu newspaper rebuked the claims and reported the farmers sad stories after the entry of BT Cotton.[23]

Perceptions of Farmers, Scientists and Traders: The study attempts to measure the perceptions of Farmers, Scientists and Traders by conducting field work in a village in Rangareddy district. Further, the opinions of certain Scientists are also procured on issues relating to Intellectual Property Rights. There are divergent opinions and views expressed in course of discussion. For obtaining the opinions of the farmers a survey is conducted in Mokila village of Shankarpalle Mandal in Rangareddy district with a questionnaire consisting of 10 questions. The size of the sampling is 100 with preliminary survey answers are gathered.

Brief profile of the Research area: Mokila village is situated around 40 Kms away from the State Capital city of Hyderabad and this is predominantly an agriculture village with most people dependent on agriculture for their livelihood. The principal crops grown in the village are Cotton and Paddy, besides certain Identified Dry Crops such as maize, bajra and so on. It is observed that people prefer modern inputs such as certified seeds, High yielding Varieties seeds, chemicals and fertilizers for Cotton Crops and follow organic manures and country grown seeds for paddy and other crops. All the farmers procure the seeds of various companies, chemical fertilizers and pesticides from the local dealers at mandal headquarters, Shankerpalli. It is learnt from the past experiences of the farmers, that certain private seed companies used to supply fake seeds and this resulted in crop loss for many farmers. However, the public Representatives and local leaders used to warm such dealers in this case of supply of fake seeds in the recent past. Further, people are also demanding compensation for crop loss. Likewise, many people prefer seeds of multinational companies for their good germination rate and choice of compensation. People are demanding more and more regulatory mechanisms for control of seed market and for providing adequate compensation to farmers in case of fake seeds and crop failure.

Respondent profile: A total of 100 respondents are randomly chosen from the village voters list and distributed the schedules to elicit opinions of the farming community on the impact of TRIPs agreement, entry of multinationals into Indian seed market, Regulatory mechanisms and so on. A questionnaire consisting of 10 questions is given to the respondents in which some questions are in open ended nature and others are in suggestive answers ode. Though the farmers have no adequate knowledge of the WTO agreements in general and RRIPs agreement in particular, they have the knowledge of successive developments in seed markets and entry of multinational corporations. The following table shows a brief profile of the respondents.

Table 5.1

Name of the village	Respondents (Total)	Land Holding (Cultivating)			Gender	
Mokila	100	1-2	2-5	6 or more	Male	Female
		27 (27%)	48 (48%)	25 (25%)	73	27
Social Status						
OC	BC	SC	ST	Minority	Illiterates	Up to 10 class	Graduate or more
16	53	18	7	6	11	81	8

The field work in carried out at Mokila village of Shankarpalli mandal in Rangareddy District. One hundred questionnaires are distributed as the size of the sample is 100. The questionnaire has brief questioning on personal profile of each respondent. Among the 100 farmers chosen, 27 farmers are marginal farmers with below 2 acres of land, 48 farmers are small farmers with 2-5 acres of land and the remaining 25 farmers are big farmers who cultivate six or more acres of land. Among these farmers some of them are owning the lands and cultivating and others are only tenant farmers who are cultivating on mutual agreement basis with owners. Further, there are 73 male and 27 female farmers chosen for the survey. Most of the female farmers are small and marginal farmers who are either widows or unmarried. With regard to the social status, 16 farmers are other castes, 53 belong to Backward classes 18 belong to Scheduled Castes, 7 are Scheduled Tribes and 6 are minorities. Further 11 farmers are illiterates, 81 farmers have only 10^{th} class and 8 farmers are graduates in terms of Educational status.

Impact of WTO-TRIPs agreement on agriculture: The Respondents were asked to identify the direct impact of WTO Agreements with reference to TRIPs agreement on Indian Agriculture. The answers were categorized as (a) Rise of prices for agricultural inputs(b) multiplied production in agriculture with innovations (c) destruction of biodiversity due to field trials and application of new innovations and (d) Corporatization of agriculture with entry of Multinationals.

Direct Impact of WTO-TRIPs agreement on Agriculture				
Total respondents	Price Rise	Multiplied production	Destruction of Biodiversity	Entry of MNCs
100	42	15	23	20

About 42 percent of the respondents believed that prices of the agricultural inputs such as seeds, fertilizers and pesticides increase due to trait value and royalties for innovations. However, 15

percent expressed the view that production will be multiplied as a result of enhanced research in agriculture. Nearly 23 percent opined that this agreement would spoil the rich biodiversity of Indian due to vigorous research and field trials. About 20 percent of the respondents were sceptical about national self-sufficiency and these agreements would pave the way for the entry of Multinational Companies into Indian agriculture.

Impact of WTO-TRIPs agreement on seed markets:- The Respondents were asked to point out the impact of WTO-TRIPs agreement on Indian seed markets. The answers were categorized as

Emergence of Multinational Companies in seed markets

Competition among seed companies resulting in quality seeds

Problem of fake and fictions (spurious) seeds

Manipulated patenting by MNCs and attempts to appropriate traditional varieties through false patenting.

Impact of WTO-TRIPs agreement on seed markets				
Respondent	Emergence of MNCs seed markets	Competition among seed companies resulting in Quality seeds	Problem of fake and spurious seeds	Manipulated patenting
100	52	17	15	16

About 52 percent of the respondents were of the view that WTO-TRIPs agreements would open the flood gates for the entry of Multinational Companies into Indian market. 17 percent expressed the view that the WTO-TRIPs agreements would encourage competition among various seed companies which results in accessibility to quality seeds. However, 15 percent of the respondents expressed doubts on quality seeds and farmers may have to fare the problem of fake seeds and spurious seeds. Among the respondents, 16 percent believed that seed companies in general and MNCs in particular may resort to manipulated patenting b appropriating the trait values of already existing traditional varieties in the name of research.

Prevalence of Innovative practices in the area: Are there any innovative practices of cultivation namely seedling, organic farming, pest control methods etc prevailing in the local area was the question. The answers were categorized as (a) yes. There are certain practices still followed (b) Some practices are followed only in Identified Dry Crops and Horticulture but not in all crops (c) There practices were followed in the past but not now (d) No Idea.

Respondents	Prevalence of Innovative practices of cultivation such as seedling, organic farming, pest control etc., in the area			
100	Yes. Certain practices still followed	These practices are followed in Id. Crops and Horticulture	Followed in the past but not now	No Idea of innovative practices in local area
	21	32	16	31

About 21 percent Respondents were of the opinion that innovative practices and are precariously followed. Among the respondents 32 percent expressed the view that these practices are followed only in Identified Dry Crops and Horticulture and not in all crops. 16 percent believe that these practices are followed in the past but not now. Around 31 percent of the respondents have no idea about the innovation practices in the local area.

Preference of Farmers on seeds: The Respondents were asked to express their choice of seeds from different sources. These sources included the (a) Traditional Varieties (b) Market seeds (c) Certified seeds of the Government and (d) Whichever is accessible.

Respondents	Preference of Farmers on seeds from different varieties			
	Traditional Varieties	Market seeds	Certified seeds of the Govt.	Whichever is accessible
100	3	68	11	18

A overwhelming majority of 68 percent Respondents expressed the view that farmers procure and prefer seeds from the Market. Only 3 percent of Respondents opined that seeds are procured from traditional sources such as previous crop seeds, neighbourhood farmers and others. Again, 11 percent of respondents believed that farmers prefer only certified seeds of the Government. Nearly 18 percent opined that farmers have no choice of procuring seeds from a particular source and continuous to procure seeds from different sources. It establishes the fact that farmers have market preference in matters of procuring seeds.

Farmers prefer seeds of MNCs: It is noticed that many farmers buy seeds generated by Multinational companies such as Du Pont, Monsanto Mahyco, Nuzveedu seeds etc., The preference of the farmers from MNCs is due to (a) germination capacity (b) pest control (c) faith on research standards of MNCs and (d) fair price,

Respondents	Farmers prefer seeds of MNCs due to			
100	Germination capacity	Pest control	Faith on Research Standards of MNCs	Fair price
	43	21	9	27

Among the respondents 43 percent viewed that the seeds generated by MNCs have good germination capacity and hence are not fake or spurious seeds. About 21 percent view that these seeds also encompass pest control trait such as Boulguard I & II in the case of cotton seeds. This would drastically reduce the additional expenditure on pesticides. Nearly 9 percent of the Respondents believe that the Research and Development branches (R&D) of MNCs are vibrant and expressed faith in the high research standards and Field trials of MNCs. Again, 27 percent of the Respondents opine that the price of the seed sachet commensurate with the quality standards of seeds which is accepted as fair price.

On knowledge on patents and royalties: The respondent were asked on their knowledge about the patents and ensuing Royalties to patent holders on all innovations. The responses are classified as

(a) yes. Knowledge on patents and Royalties (b) knowledge on patents but no knowledge on Royalties (c) Knowledge on Royalties but no knowledge on patents system and (d) No knowledge either on patents or on Royalties.

Respondents	Knowledge on patents and Royalties			
100	Yes knowledge on Patents and Royalties	Knowledge on patents but no knowledge on Royalties	No knowledge on Patents but knowledge on Royalties	No knowledge either on Patents or on Royalties
	36	12	18	34

Out of the 100 respondents, only 36 percent have complete knowledge about Patents and Royalties. About 12 percent have knowledge only on Patents but no knowledge on Royalties. Likewise, 18 percent have knowledge about Royalties but have no knowledge on Patents. Around 34 percent of the respondents have knowledge neither on Patents nor on Royalties. Many of the respondents have poor knowledge on Patents.

Knowledge on Telangana State Agriculture Department IPE Cell: The Telangana State Government is encouraging the farmers to innovate new practices in agriculture. As such, the State agriculture department has constituted a new administrative cell known as Intellectual Property Rights Cell (IPR Cell) to register innovations of the farmers and claim patents for farmers. A question is asked about the information about this Cell.

Respondents	Telangana State Agriculture Department's IPR Cell			
100	Yes. Knows about IPR Cell and details	Knowledge on some details	About IPR Cell	No Idea
	6	17	25	52

Among the Respondents, only 6 percent have complete knowledge on IPRs and IPR Cell of the Telangana State Agriculture Department. About 17 percent respondents have partial knowledge about the IPR Cell. Among the respondents, 25 percent have only heard of the IPR Cell but have dismal knowledge about any details. Interestingly, 52 percent of the respondents have no idea of the IPR Cell and have never heard about it. Though the State Government is making efforts to motivate the farmers on registering patents, the information is not percolated to downwards at the field level. However, the levels of consciousness may arise in the course of time as some farmers were enthusiastic about it.

Information about people making Patent applications in the area: The Respondents were asked to give details about any one applying for patents in the local area either through the IPR Cell of the State Agriculture Department or on their own. The responses are classified into (a) Yes (b) Heard but no details (c) No (d) No Idea.

Respondents	Information about people making patent application in the area			
100	Yes	Heard but no details	No	No Idea
	Nil	12	27	61

None of the respondents have clear information about people making patent application in this area either under the guidance of the Telangana State Agriculture Department or on their own. Among the Respondents, 12 percent have heard about some farmers claiming patents but have no details. 27 Percent have admitted that no information is known to them. About 61 percent opined that they have no idea of patent application or claiming a patent.

Justification to Royalties on Patents: The Respondents were asked to justify the Royalties on Patents in general and agricultural inputs in particular. The responses are classified (a) Yes justified (b) Justified but on a reasonable quantum of Royalty (c) Not justified on agricultural inputs and (d) not at all justified for any patent.

Respondents	Justification for Royalties on Patents in general and Patents on Agricultural inputs in Particular			
100	Yes. Justified	Justified but reasonable quantum of Royalty	Not Justified in Agriculture	Royalties need not be paid
	37	38	11	14

Among the 100 respondents, 37 respondents have justified Royalties for patents as innovations deserve cash incentive for appreciation. Again, 38 respondents have justified only reasonable Royalties on Patents. Some of them are convinced that the Patent holder might incur some expenditure for innovation. Besides this, a reasonable royalty in the form of cash is acceptable. However, 11 respondents have not justified Royalties on Patents in agriculture. Remaining 14 respondents have not seen any reason for justifying Royalties on Patents as the Patent holder can sell his patents to Multinational Companies for commercial use.

Decision on Quantum of Royalty: The respondents were asked to suggest the authority which can determine the Quantum of Royalty on Patents. The responses are classified as (a) Patent holder himself (b) Government under an independent board (c) Civil Society with concerned citizens and organizations and (d) Market.

Respondents	Authority that decide the Quantum of Royalty on Patents			
100	Patent holder himself	Government under an Independent Board	Civil Society with concerned citizens and organization	Market
	22	34	17	27

Among the respondents, 22 percent expressed the view that patent holder himself should determine the quantum of Royalty as the concerned person could have incurred a lot expenditure for the innovation. However, 34 percent of the respondents believed that the Government should decide upon the Quantum of Royalty on the suggestions of an Independent Board or a Quasi-Government authority. 17 percent have the view that civil society consisting of concerned citizens and organizations should decide on Royalties. 27 percent of the respondents opined that market forces should be allowed to decide the Quantum of Royalties on Patents.

CONCLUSION:

Agriculture is considered to be an important sector of Indian economy. Successive governments in post-independence period accorded top priority for high growth rates in Agriculture. Indian has achieved interesting results in agriculture during green revolution era. The process of liberalization in the agriculture is started during late 1990's with input market (seed market) liberalization. The Agreement On Agriculture (AOA) of WTO was accepted by India, the resulted in quantum of subsidies and the green box experienced fluctuating sanctions. India had also adhered to the Trade Related Intellectual Property Rights (TRIPs) agreement and made changes in the legal framework in accordance with the provisions of this agreement. The impact is seen on seeds sector. Accordingly kit has recognized the patent system and an effective *Sui generis* system. The TRIPs agreement recommended UPOV (1991) for Protection of Plant Breeder Rights. The Indian Government has enacted the Protection of 'Plant Varieties Protection and Farmers Rights (PPV & FR) Act 2001. This Act has recognized the Plant Breeder Rights and Farmers Rights such as, the right to a) Save the seeds b) Use the seeds c) Exchange the seeds d) Share the seeds e) Sell the seeds or propagating material f) Sow the seeds and g) Re sow the seeds.

As a result of Trade Liberalization in Agriculture inputs, multinational companies have entered into the Indian Seed Market. It has also facilitated transfer of technology through Genetically Modified Varieties in seeds. The perceptions of farmers and traders are also obtained in Shankarpally area of Rangareddy District. Most of the farmers expressed satisfaction as it has multiplied the production and brought quality seeds with fair prices. However, farmers and traders expressed the need for a strict regulatory mechanism on seed markets.

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