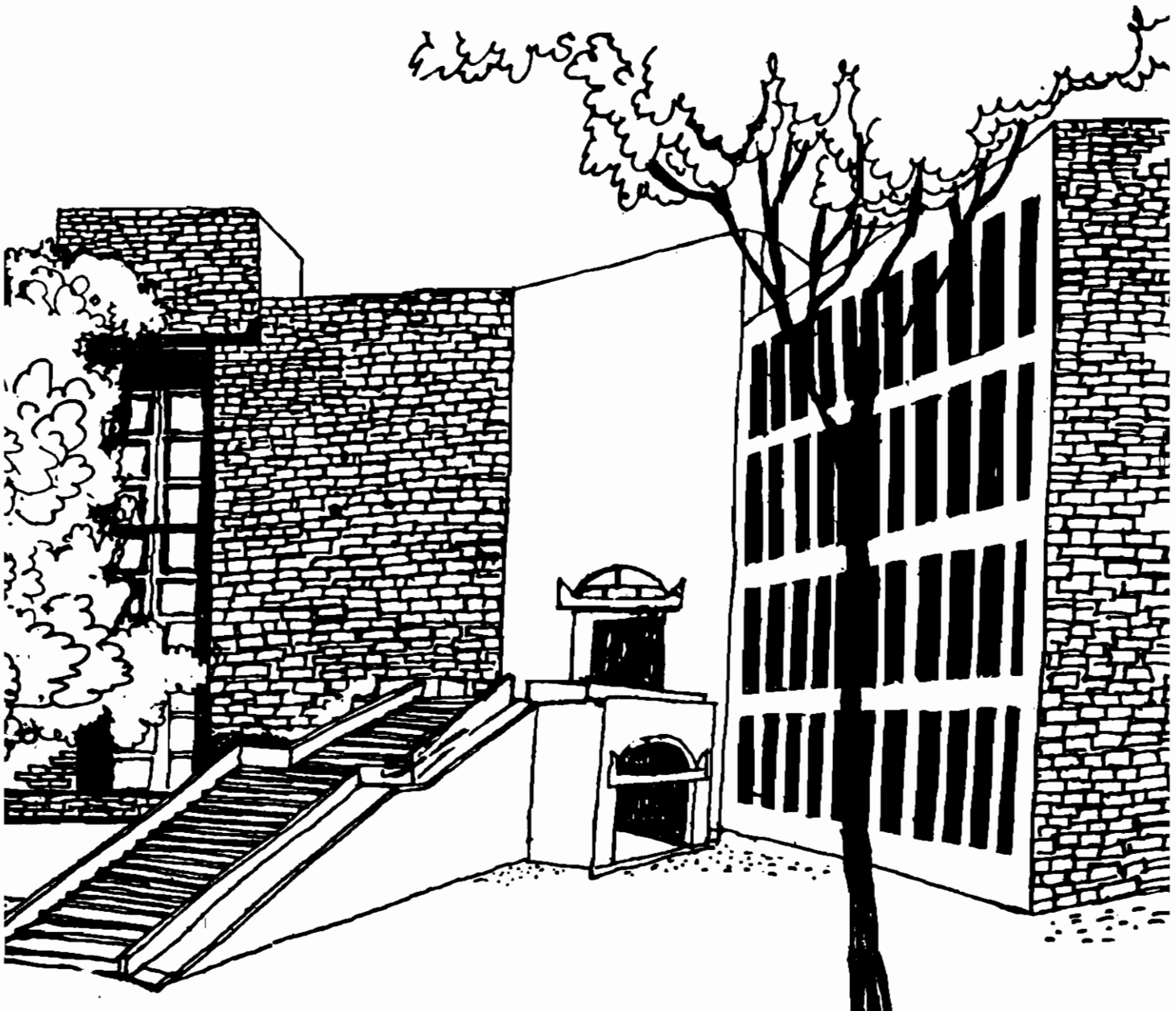




Working Paper



Intellectual Property Rights, Farmers' Movements and Seed Industry in India

Gurdev Singh
S.R. Asokan

W.P. No. 1227
January 1995

The main objective of the working paper series of the IIMA is to help faculty members to test out their research findings at the pre-publication stage.

WP1227

WP

1995

(1227)



Indian Institute of Management

**PURCHASED
APPROVAL**

GRATIS/EXCHANGE

PRICE

ACC NO.

VIKRAM SARABHAI LTD

I. L. M. AHMEDABAD

Intellectual Property Rights, Farmers' Movements and Seed Industry in India

By Dr.Gurdev Singh and Mr.S.R.Asokan¹

The Indian Patents Act of 1970 excludes all living organisms from the scope of patentability. It also excludes product patents of all substances intended for use or capable of being used as food or as medicines or drugs. As far as processes are concerned i) a method of agriculture or horticulture and ii) any process for the medicinal, surgical, curative, prophylactic or other treatment of human beings or any process for a similar treatment of animals or plants to render them free of disease or to increase their economic value or that of their products are not patentable.

Convention for the Protection of New Varieties of Plants known as UPOV convention first signed in 1961 was revised in 1972, 1978 and more recently in 1991. In comparison to the 1991 convention, the protection conferred by the 1978 convention was less stringent. It was limited to varieties of nationally defined species and for a minimal period of 15 years. The main difference is that under 1978 convention the use of potential variety to breed new plant varieties requires neither authorization nor payment of royalties(Appendix I). Since there was not much progress under the World Intellectual Property Organization (WIPO) between developed and developing countries regarding Intellectual Property Rights (IPRs) it was linked to international trade under General Agreement on Trade and Tariff (GATT). This move made the developing countries access to export markets in industrialized countries contingent upon advances in IPRs.(Wijk et al 1993).

The Trade Related Intellectual Properties(TRIPs) agreement negotiated under GATT stipulated that inventions in all branches of technology whether products or processes shall be patentable provided they are new involving an inventive step and are capable of industrial application. The member countries are required to develop a new system to protect plant varieties by patents or by an effective *sui generis* system or by any combination thereof.

Farmers in some parts of India protesting against the GATT negotiations directed their ire against the multinational seed companies. Slogans like "Quit India" "Salt Sathyagraha" once used against the colonial rule were revived and directed at multinational seed companies. A group of farmers ransacked the office of Cargill - a multinational- at Bangalore. Many intellectuals like scientists, journalist, academicians viewed the farmers stand sympathetically and some even joined hands with the farmers in the campaign against IPRs.

The Government of India has already drafted a legislation to protect the plant varieties as per the GATT agreements. It is going to be introduced in parliament soon. In this paper we have tried to

1 The authors are Professor and Research Associate respectively, Centre for Management in Agriculture, Indian Institute of Management, Ahmedabad. India.

analyze the farmers' movement vis-a-vis IPRs and explored some alternatives to minimize the confrontation in the post IPR period.

Status of Seed Industry in India

Indian farmers annually use seeds worth around 2 billion US dollars. However only a fraction of that comes from the organized sector. The turnover of the seed industry for 1993 was estimated around 250 million dollars. It is apparent that just above one tenth of the requirement of the farmers come from formal sources. The rest of their need is met through retention of the crop for seed purposes and lateral exchange of seed among themselves. Seed Replacement Rates(SRR) is another indicator of demand for seed from organized sector. The replacement rates of seed are very low in India (Appendix IV). It is just 6.4 percent for wheat and 11 percent for paddy. This indicates that retaining crop for seed purposes and exchanging them with fellow farmers are quite common. This prompted the expert group on seeds to suggest "in order to increase the SRR foundation seed of self pollinated crops such as paddy, wheat etc may be distributed to farmers other farmers can buy seed from these farmers in the subsequent season." Even the World Bank assisted National Seed Project acknowledges "the cost effectiveness and simplicity of such a system" and states that "the emphasis should shift to providing technical input to encourage farmers to grow their own seed of self pollinated varieties."

Farming in India is a subsistence activity and not a commercial venture to a large number of farmers. Therefore, retaining own crop for seed purpose would continue to remain a principal source of seed.

The Government of India took a proactive role in developing the seed industry by establishing research institutes as well as creating facilities for multiplication and distribution of seeds. Simultaneously lot of incentives were given for the growth of private sector.

Although private sector has developed more than 120 hybrids (Agrawal,1988:8) many of which were well received by the farmers seed research in India is predominantly confined to public sector institutions like the Indian Council of Agricultural Research (ICAR) and State Agricultural Universities. There are thirty nine central research institutes of which fifteen are actively involved in research related to crop production and protection including plant breeding. There are twenty five state agricultural universities which integrate agricultural research education and extension training. The breeder and foundation seeds of varieties and hybrids developed by these institutions are provided to both private companies and public sector corporations for further multiplication and distribution. There are a large number of small companies operating in the country catering to a district or two. These companies do not have any breeding programme they rely exclusively on public institutions for new varieties and hybrids.

There are fourteen public sector corporations involved in multiplication and distribution of public bred lines. Besides spread of research varieties through formal sources state agricultural universities release

new varieties directly to the farmers in the form of mini kits and trial packs. Such releases were found to have spread faster among the farmers. For example in the state of Punjab the lateral spread of new varieties through mini kits was so high that the state seed corporation found new varieties fairly well spread among the farmers before it could obtain them from the Universities and organize production (Singh et al 1990:99).

In the 1980s the Government abandoned the protectionist policy and liberalized the seed industry which paved the way for the entry of MRTP² and FERA³ companies in the seed sector. The New Policy on Seed Development(1988) resulted in many collaborative ventures with the foreign companies (Appendix V). With the overall liberalization of the economy in recent years investment climate has become even more conducive for foreign companies.

Along with GATT negotiations the entry of multinationals increased the clamour for protection of plant varieties. The domestic seed companies also joined the fray in demanding protection. The Second Seed Seminar (1989) on Plant Variety Protection Pros and Cons felt that the "time is ripe for introducing Plant Breeders Rights (PBRs) in India in order to further strengthen crop improvement research and to provide better quality seeds to farmers." The absence of plant variety protection is said to be a disincentive for seed companies to do research on varieties. "Due to enormous expenditure involved in R and D and extension to popularize new HYV/hybrids among Indian farmers and in the absence of any protection the private breeding was limited to vegetables, flowers and a few other crops." (Sinha 1989). However, a study on the Impact of Plant Variety Protection Act 1970 in U.S. found that investment by private companies increased only in soybeans and wheat, not in other open pollinated crops (Butler and Marion 1983:39). Private agricultural research investment has been spread very unevenly among crops with soybeans receiving the greatest attention. Minor crops, including several vegetables, have received no investment at all (Lesser 1990:61).

The Government of India has prepared a draft legislation on plant varieties protection. The Act will be known as the Plant Varieties Act (PVA) 1993. The main features of the Act are as follows:

- Plant variety protection shall be granted where a variety is new, distinct, uniform and stable.
- Production, offering for sale, marketing and export and import in respect of the seed and/or propagating material of the protected variety for commercial purposes shall require authorization of the breeders.
- Period of protection is 15 years; for trees and vines 18 years.
- The plant variety protection rights are not deemed to be infringed by the production, sale, disposal, export or import for other than reproductive purposes of harvested material.

2 Monopoly Restrictive Trade Practices

3 Foreign Exchange Regulation Act

- Farmers are allowed to save, use, exchange, share and sell propagating material of seed from seed obtained and descended of seed obtained of protected variety.
- A sample of the variety has to be deposited with the National Gene Bank.
- In recognition of the contribution made by the rural communities with sustained perseverance in the development on farm innovations, enrichment and conservation of plant genetic resources, the authorities may when deemed appropriate require the breeder seeking protection under this Act to provide for rewards and compensation to such communities.
- Researchers have free and complete access to protected materials for research. The acts done for experimental and/or research purposes and for developing new varieties of plants shall not require authorization of the breeder.
- The Breeder should ensure the availability of sufficient quantities of seed of the protected variety.
- The authorities may license anyone to produce the protected variety in case it is not available in sufficient quantities at reasonable prices.

Farmers organizations in different parts of the country voiced serious concern about the GATT agreement in general and the plant variety protection in particular. The major concerns are: a) farmers will have to pay royalties to use their own produce as seed. The proposed Act, however, excludes from its purview the farmers use of their own seed. b) Under the new regime the small seed companies may be taken over by big companies and multinationals the emerging oligopolistic situation will lead to higher seed prices. c) The mini kits and trial packs of the new varieties given to the farmers by the agricultural universities which is an important source to them may be stopped under the new regime.

In the state of Karnataka a group of farmers belonging to the Karnataka Rajya Raitha Sangha (KRRS), a farmer's organization ransacked the corporate office of the multinational Cargill seeds on December 1992. KRRS served an ultimatum to the multinational to close down the seed processing plant at Bellary. The partly built structure of the plant was damaged by KRRS activists on July 12, 1993. Prof. M.D. Nanjundaswamy the president of KRRS and a member of the state legislative assembly announced that quit notices had been served on all multinational companies such as Sandoz, Hoechst, Ciba-Geigy, Merck and Pacific etc operating in seeds in the state. Further, the KRRS teamed up with Gene Campaign a non political organization consisting of a group of scientists, intellectuals, journalist etc and the Bharatiya Kisan Union led by Mahendra Singh Tikait which is strong in the northern states of Uttar Pradesh, Punjab and Haryana. They organized a rally in Delhi in March 1993. The leaders of the "Seed Sathyagraha" warned the government against any step that might transfer the control of seeds to the multinationals. KRRS carried out a campaign with the dealers against stocking Cargill Seeds. John Hamilton, Managing Director of Cargill Seeds admitted that the company's performance was "embarrassingly bad". The company had to write off products and recorded depressed sales. (This season the company claimed to have tripled its sales)(Phadnis 1994). As part of its campaign against the IPRs, KRRS has decided to establish its own seed research centre in Karnataka. It aims at the free

exchange of seed between Indian farmers and farmers of other developing countries. Among KRRS' partner organizations that are already supporting the establishment of farmers' managed seed conservation and seed supply activities are the *Laxmi Mukthi* and the *Shetkari Mahila Agadi* the womens' wings of peasant organization working in the state of Rajasthan (Pandey 1994:10). In the past the farmers organizations wrested many concessions from the government on electricity tariffs, cooperative credit, agriculture taxes etc by organizing mass protest rallies. In order to understand how serious is the threat of the farmers against IPRs it would be useful to trace the farmers' movements in India and see in some detail the growth of the vociferous KRRS.

Farmers' Movements in India

Farmers' movement have a long history in India. However, the cause, course and nature of the movements varied over time depending on the socio-politico-economic set up. Revolts by the peasants against the Mughal tax collectors were reported more than three hundred years ago (Dhanagare 1983:27). The land policy introduced by the British compounded the problem. The *Zamindari*, *Ryotwari* and *Mahalwari* systems introduced in different parts of the country resulted in exploitation and oppression of the peasants. Sporadic disturbances were reported in many parts of the country. "Either the peasants revolted against their oppressors the landlords under whom they held land or sometimes all the agrarian classes joined together and rebelled against the severe demands of the state." (ibid:34). By the turn of the century organizations like the Bihar Provincial Kisan Sabha (1928), the Andhra Provincial Ryots Association and the All India Kisan Sabha (1936) were formed to ameliorate the conditions of the peasants.

In the early post independent period these organizations were concentrating on issues like land reforms i.e. land to the landless, better deal for the tenants and share croppers etc. However, the 1970s and 1980s witnessed birth of farmers' organizations in different parts of the country. These organizations resorted to various forms of agitations on issues like better procurement price for the agricultural produce, lower electricity tariff, subsidized fertilizer, waiving of cooperative loans, reducing agricultural tax, lower irrigation cess etc. Issues like the government land to the landless, free education, houses, medical aid etc to the farm labourers were included in their demands to co-opt the landless agricultural labourers - a significant rural population to make the agitations mass based involving all the segments of the rural communities. Notable among such farmers organization are: the Tamilnadu Agriculturists Association led by Narayanaswamy Naidu, the Karnataka Rajya Raitha Sangha led by Nanjundaswamy, the Shetkari Sangathana in Maharashtra headed by Sharad Joshi and the Bharatiya Kisan Union led by Mahendra Singh Tikait. To press their demands these organizations resorted to mass rallies, blocking rail and road traffic, courting arrest in thousands to fill the prisons etc. They succeeded in achieving many of their demands on prices, electricity tariff, cooperative loans, irrigation charges etc. More than sixty five percent of India's population is engaged in farming and other related activities constituting a substantial vote bank. The political parties whether ruling or opposition would hardly afford to antagonize them. At least on two occasions in the state level polls

they proved that they could swing the fortunes in favour of a particular party. However, when these organizations themselves contested elections they met with disaster.

After the death of Narayanaswamy Naidu the Tamilnadu Agriculturists Association became defunct. Sharad Joshi of the Shetkari Sangathana welcoming GATT agreements on the grounds that it would benefit the Indian farmers by fetching international price it is left to KRRS and BKU to campaign against IPRs.

Karnataka Rajya Raitha Sangha⁴

An irrigation system was introduced in Dharward district a chronically drought prone region which altered the farming from subsistence to commercial venture. However, prices of cotton which was grown in the area crashed, simultaneously the price of fertilizers increased. While the farmers were growing under this burden attempts were made to collect a betterment levy with retrospective effect on the basis of increase in land values following irrigation. As the memorandum and representation to the government evoked poor response the farmers resorted to direct action and picketed the taluka offices which resulted in violence and police firing. This led to large scale protest in other parts of the state.

By August 1980 *Raitha Sanghas* or the farmers associations were active in many districts of the state. These associations joined together and drafted a charter of 19 demands which was felt common to all farmers. It was decided to launch an intensive campaign to get the demands accepted. The KRRS was set up at the state level. It organized a rally and blocked the roads at Shimoga to demonstrate its strength. It put before the state government the 19 demands. The government accepted 12 of those demands and promised favourable consideration of other demands after consultation with the central government and the central bank.

On December 27, 1982, few days before the January 1983 state assembly elections KRRS issued a call to overthrow the government. The ruling congress party was defeated in the polls.

The hardcore of KRRS consisted of sugarcane growers and their problems dominated the movement. The farmers staged a dharna near the state assembly premises asking higher price for sugarcane. The government reached an agreement with the farmers to clear their dues from the mills and agreed to fix the price of cane after taking into consideration the price of levy sugar and open market sugar and the increased price of inputs. Harassment of the farmers by officials for loan recovery was another important issue taken up by the KRRS. It had been the practice of the officials to deliberately humiliate the defaulters by announcing their names in public and attachment of utensils of every day use. It was mainly to prevent such harassment that farmers put up boards at entry points of villages asking officials and 'corrupt politicians' not to enter villages without permission.

4 Based mostly on M.V. Nadkarni's work *Farmers Movement in India*

The farmers staged a *dharna* to protest against court summons and auction of their property for defaulting loans and pressing the government to withdraw all cases against the farmers. The government waived the interest arrears and allowed the farmers to pay the principal which majority of the farmers did.

Paddy growers were piqued by the levy system and the restrictions on inter-district movement of paddy which depressed paddy prices in surplus districts. After KRRS took up the issue the government made five paddy zones within each zone free flow of paddy was allowed. Each zone comprised both surplus and deficit districts.

Another vital issue the KRRS took up was the exploitation of the rural resources. In the villages of Kanakapura *taluka* near Bangalore, granite was extracted and exported with no benefits to the villages concerned. KRSS activists stopped the transportation of the granite till the quarry owners paid royalties for the village improvement in addition to paying the dues to the government. They claimed to have collected Rs 1.8 million within two months. The agitation was symbolic of the resolve of the farmers to prevent the loot of rural resources for the benefit of the few affluent people.

The leaders of KRRS also gave a call to farmers elsewhere to stop transportation of material resources like sand, granite and timber and demanded their exploitation in a more rational manner so as to preserve the environment and bring benefits to the rural people. The KRRS followed this by setting up *Gram Swarajya Samitis* to promote the use of local resources for village betterment and regulate their urban use. Royalties were demanded for the *samitis* to exploit such resources. The *samitis* stipulated the quantum of use of the resources.

Though such *samitis* did not exist in many places the village level *raitha sanghas* took interest in promoting and implementing the official development programmes.

In Maddur by election to the Assembly in May 1984 KRRS once again demonstrated that it could swing the electoral fortunes. It called upon its followers not to support the ruling party candidate. The candidate was defeated.

However, the KRRS was very hesitant to enter electoral politics. It felt that the agitational politics yields quicker results than parliamentary politics. But succumbing to pressure within the *Sangha* entered the electoral fray in December 1984 for *Lok Sabha*(Parliament) and February 1985 for assembly polls and met with disaster. KRRS counterpart the TaminInadu Agriucturists Association which was converted into Tillers and Toilers Party met with the same fate in the hustings earlier. By becoming a political entity the farmers movements loss their mass support as they are divided on party lines besides, the dynamics of rural society works against them e.g. the landless labourers of rural India would not support them as they view the land owners as their exploiters.

In the recent elections (December 1994) for the state assembly the ruling Congress party lost badly and was relegated to third position for the first time in the state. The KRRS President Nanjundaswamy lost his seat to the assembly. However, a KRRS candidate won from Pandavapura constituency. The KRRS accused the victorious Janata Dal of hijacking its electoral platform. Some of the victorious candidates of Janata Dal are former leaders of KRRS (Pani 1994).

Farmers and IPRs

Farmers were concerned about the introduction of protection for plant varieties on three major counts. a) They will not be able to save seed for subsequent use without authorization and payment of royalties to the breeder or company. b) IPR will lead to an oligopolistic control of the seed market by a few resulting in rise in prices of seeds. c) Public bred varieties which were supplied to the farmers in the form of minikits by many state agricultural universities may not be available under the new regime. Are the farmers concerns real? Let us examine them.

Farmers consider it their 'inalienable' right to retain, use and dispose of the seeds as they wish. Introduction of protection and preventing farmers from doing so is considered tantamount to infringement on their rights. This is an emotive issue on which farmers organizations mobilized support and demonstrated in Delhi and ransacked the office of a seed company in Bangalore. Taking into consideration the farmers stand as well as other factors the government has drafted a PVA which recognise the right of the farmers to save seed for the subsequent generation. However, TRIPs proposal envisages a review of Article 27 after four years when patent like protection may be introduced and farmers may lose their right to save seed. When such a regime is imposed after four years it would definitely meet with stiff resistance and the farmers' organization throughout the country may use all sorts of agitational means to retain their right to save seed. By granting exemption in the present proposed Act the issue has been put off for some more time.

The introduction of PVA may result in large number of takeovers and mergers as the small companies may not be able to withstand the competition. Most of the small companies rely exclusively on public bred varieties for multiplication and distribution. Under the new set up this flow of new varieties will be restricted due to high prices resulting in closure of many companies. The multinationals and a few big domestic seed companies will dominate the scene which will give rise to higher seed prices. Butler and Marion(1983) found albeit inconclusively that introduction of PVPA in the United States has contributed to the large number of mergers. Within ten years of introduction 50 percent of the PVP certificates were held by 14 conglomerates. They also found that there was an increase in seed prices in the post PVPA period. However these increases were considered to be not unreasonable. The reason being that there were two important checks on the pricing of privately protected varieties. a) farmer saved seed and b) the availability of publicly developed varieties. Under the proposed system though farmers are exempted the public developed varieties are to be protected. So, an important check is removed. Therefore the farmers concern on rise in seed prices in the post PVA situation is not unjustified.

In India the State Agricultural Universities are an important source of new varieties of seed to the farmers. They provide farmers with mini kits of foundation seed of newly developed varieties which result in lateral spread of seed among the farmers. Under the new system the varieties developed by the public institutions like agricultural universities and ICAR institutes are to be protected. So, the only avenue left for the farmers is the seed companies and corporations where the prices of seed at the start of the season tend to be high at the beginning even in normal circumstances. The new set up will result in still higher prices.

Nearly two third of the population in India is engaged in agriculture and related activities. Any decision which has adverse effect on this substantial segment will lead to lot of unrest. Time and again farmers organizations in the past have proved their capacity to cause disruption. Caught between the GATT agreement and the disgruntled farmers the government has to do some tight rope walking. It has very few options.

Public plant breeding has a major impact on the performance of the seed industry in India. The introduction of PVA may result in increased investment in the private sector for a few crops. However, the role and the responsibilities of public sector would be increasing rather than diminishing in the post IPR regime. Therefore the public sector research should be strengthened. It should continue to provide the newly developed varieties to the private seed companies at reasonable prices so that seed is available at affordable prices to the farmers. The small seed companies many of which do not have breeding programmes may be able to remain in business and thwart the seed market emerging into an oligopolistic one. At the same time the varieties developed should be registered under the PVA in order to prevent any company exploiting the variety to derive new variety without authorization. Further, the state agricultural universities should continue to provide the mini kits and trial packs to the farmers which should be allowed to spread laterally among the farmers. These steps may act like a check against domination of the seed market by a few in terms of price and availability.

Many studies have shown very high rate of return to different types of plant breeding research. In fact, returns from investment in public sector agricultural research have been found to be higher than for investment in industrial R and D. Therefore, investments in public sector research should be viewed from the larger perspective of social benefits rather than income accruing out of royalties. Further, increased investment in public sector research will help to continue research in the so called minor crops which would be neglected by the private sector for not having immediate commercial value but may be valuable in the future plant breeding.

There should be increased South-South cooperation in sharing genetic materials and sharing the fruits of research. India has a very large National Agricultural Research System (NARS) and excellent scientific expertise. This can be used by other developing countries for mutual benefits. India should enter into bilateral agreements with those countries which are willing to supply germplasm and have a stake in the outcome of the research.

Wijk et al. feel developing countries often ignore public domain technology which are knowledge "spillovers" and innovations which are not protected. Screening and using such public domain technology is a viable policy option for NARS. India should ensure constant monitoring of such technology and incorporate them in its research efforts.

The proposed PVA allow exchange of germplasm with those who allow access to their germplasm by India but restricts such exchanges with others. As proposed in the U.N convention on Bio diversity regarding the exploitation of the genetic material and the preferential treatment in transferring the technology for the countries of origin the access to germplasm to the private seed companies should be made contingent upon sharing the variety developed. For example, if a variety is developed out of the germplasm collected in India, India should get preferential treatment in getting the variety in terms of lower cost or shorter period of protection say 3-4 years instead of 15 years. The variety developed may be provided under license with preferential terms to the public sector organizations in India. Access to the variety developed may result in larger social benefits than providing monetary compensation to the country or community from which the genetic material originated. Suitable agency should be identified to monitor and enforce that the companies honour such commitments. A strong public sector would facilitate in absorbing the technology and diffusing the variety developed.

Appendix I

Main Provisions of PBR under UPOV 1978,1991 and Patent

Provisions	UPOV 1978	UPOV 1991	Patent Law
Protection coverage	Plant varieties of nationally defined species	Plant variety of all genera and species	Inventions
Rèquirements	Distinctness Uniformity Stability	Novelty Distinctness Uniformity Stability	Novelty Inventiveness Nonobviousness Industrial application and usefulness
Protection term	Minimum 15 years	Min.20 years	17-20 years(OECD)
Protection Scope	Commercial use of reproductive material of the variety	Commercial use of all material of the variety	Commercial use of protected matter
Breeders' exemption	Yes	Not for "essentially derived variety"	No
Farmers' Privilege	In practice: Yes	Upto national laws	No
Prohibition of double protection	Any species eligible for PBR protection cannot be patented.		

Source : Wijk et al 1993 pp 8.

<i>Appendix II</i>	
Value of Seeds Used in Agriculture over the years	
(Rs in millions)	
Year	Value
1980-81	16820
1981-82	18440
1982-83	19990
1983-84	21250
1984-85	21890
1985-86	23860
1986-87	24930
1987-88	28250
1988-89	31920
1989-90	36210
1990-91	42870

Source: Centre for Monitoring Indian Economy, August 1994.

<i>Appendix III</i>					
Production of Certified/Quality Seeds					
(Million Quintals)					
Year	Cereals	Pulses	Oilseeds	Fibres	Total
1980-81	187.4	10.2	1.4	7.0	218.6
1981-82	201.3	11.9	4.4	9.6	241.8
1982-83	292.9	20.7	16.5	13.5	366.1
1983-84	303.7	16.0	49.5	8.0	412.6
1984-85	372.9	24.0	47.1	17.8	499.7
1985-86	306.9	28.3	48.3	30.1	448.4
1986-87	382.1	44.8	61.9	22.5	565.1
1987-88	347.5	55.3	80.1	11.7	535.6
1988-89	382.6	34.8	72.2	14.8	566.9
1989-90	348.2	35.2	87.6	20.2	570.4
1990-91	344.1	35.4	86.9	22.0	571.0
1991-92	353.1	37.7	92.1	23.3	575.0
1992-93	367.0	43.0	54.5	47.5	530.0

Source: Govt of India, Ministry of Agriculture

<i>Appendix IV</i>				
Statewise Seed Replacement for Certified/Quality Seed during 1988-89				
(Per cent)				
State	Wheat	Paddy	Sorghum	Bajra
Andhra Pradesh	17.41	21.75	32.00	43.00
Assam	96.35	9.28	-	-
Bihar	4.82	4.74	-	-
Gujarat	10.03	10.02	-	-
Haryana	5.95	8.06	-	39.11
Himachal Pradesh	22.00	9.00	-	-
Jammu & Kashmir	11.38	5.23	-	-
Karnataka	10.00	18.00	-	-
Kerala	-	10.00	-	-
Madhya Pradesh	2.03	3.10	11.12	19.19
Maharashtra	5.85	1.59	55.00	55.00
Orissa	15.00	2.01	-	-
Punjab	1.20	5.07	-	-
Rajasthan	4.58	3.67	4.00	26.77
Tamilnadu	-	14.00	9.00	25.00
Uttar Pradesh	3.24	7.58	0.22	3.51
West Bengal	25.00	14.00	-	-
All India	6.34	11.09	14.59	42.07
Source : GOI, Expert Group on Seeds, 1989.				

Appendix V

Details of Foreign Collaboration in Respect of Seed and Planting Material					
Name of Indian Company	Name of Foreign Company	Name of country	Name of the product/activity	Type	Year
1	2	3	4	5	6
Cargill Seeds India Pvt. Ltd.	Cargill Inc.	USA	Hybrid Seeds	Fin	1986
Sandoz India Ltd.	Zaadunio B.V.	Holl	High Yielding variety of seed, etc.	Tech	1987
Sandoz India Ltd.	Northrup King Co.	USA	High yielding seeds plantlets	Tech	1987
ITC Agrotech Ltd.	Continental Grains	Australia	Hybrid seeds	Tech	1988
Bejo Sheetal Seeds P. Ltd.	Bezo Zadan B.V.	Holland	Hybrid Seeds	Fin	1988
PHI Biogene Pvt. Ltd.	Pioneer Overseas Corpn.	USA	Hybrid Seeds	Fin	1988
Bihar Seeds Corpn.	Pacific Seeds	Australia	Hybrid quality Sunflower Seeds	Tech	1988
Nath Seeds Pvt. Ltd.	Dobi Gon & Co.	USA	Hybrid Sunflower Seeds	Tech	1988
Welcome Seeds Pvt. Ltd.	NRI Cases India/U.K.	U.K.	Vegetable Seeds	Fin	1989
Bilt Treotech P. Ltd.	Plantex	Aust	Propagating of trees, shrubs, ornamental flowers	Tech	1989
Omega Agseed India	Agseeds Pvt. Ltd.	Australia	Improved Variety of seeds	Fin	1990
Bharat Pulverising Mills Ltd.	Nova Seeds	USA	Oil seeds/pulses/vegetable seeds	Fin	1990
Bisco Seed Tech.P.Ltd.	Agripro Bio Sciences Inc.	USA	Hybrid Seeds	Tech	1990
Nath Seeds Ltd.	K.Z. Gebroaders	Holland	Vegetable hybrid seeds	Fin	1990
Maharashtra Hybrid Seed Co. Ltd.	Asgrow Seeds Co.	USA	Hybrid Vegetable seeds	Tech	1990
ECL Agrotech	Controcoop.	Yugoslavia	Hybrid Seed	Tech	1990

1	2	3	4	5	6
Harrisons Malayalam	Agri Saatan GmbH.	West Germany	Hybrid Seeds/ HYV of Vegetable	Tech	1991
Harrisons Malayalam	Semynio Szatzucht GmbH.	West Germany	Hybrids/HYV seeds of field crops	Tech	1991
Harrisons Malayalam	Green Tek/ Cultiss (yet to be approved by SIA)	Holland	Plant Tissue Culture	Tech	
Intercorp Inds. Ltd. N. Delhi	Rustica Semences	France	Hybrid Seeds	Tech	1992
Raunaq International Ltd.	Centrocoop and Instt. of Field and Vegetables Crops Faculty; Uni. of Agri. Novisat	Yugoslavia	Hybrid seeds	Fin/ Tech	1992
Southern Petro Chemicals Inds. Corpn.	Pioneer Overseas Corpn.	USA	Hybrid Seeds	Fin	1993
Proago-PGS India Ltd. N. Delhi	Plant Genetic Systems International NV	Belgium	Hybrid oil-seeds rape and vegetable seeds	Tech/ Fin	1993
Micro Planate Ltd., Bombay	Kemira OY	Finland	Hybrid and synthetic seeds	Tech	1993
Pioneer Overseas Corpn.	Pioneer Overseas Corpn.	USA	100% owned Research Co. on hybrid seeds		1993
Source: National Conference on Seeds, 1993. Agenda papers, Annexure V. pp 39-41 Pandey (1994), p. 10					

References

- Agrawal, P.K. *Plant Breeding and Breeder Seed Production - A case study* (Mimeo) Indian Agriculture Research Institute. New Delhi, 1988.
- Buller L.J. and B.W. Marion. *The Impacts of Patent Protection on the U.S. Seed Industry and Public Breeding*. Monograph 16. University Of Wisconsin. 1983.
- Dhanagare D.N. *Peasant Movements in India*, Allied Publishers Pvt. Ltd, 1987.
- Govt of India, *Report of the Expert Group on Seeds*, 1989.
- Govt of India, *National Seed Project III*, 1988.
- Surdev Singh, S.R.Asokan and V.N.Asopa, *Seed Industry in India: A Management Perspective*, Oxford & IBH, New Delhi 1990.
- Lesser, W. Sector Issues II: Seeds and Plants. in Siebeck W (ed) *Intellectual Property in Developing Countries* World Bank Discussion Paper (112). 1990.
- Nadkarni, M.V. *Farmers' Movements in India*, Allied Publishers Pvt Ltd. 1987.
- Pandey, B Hybrid Seed Controversy in India, *Biotechnology and Development Monitor* No 19. June 1994.
- Pani, N., KRRS Appeal flops as JD Hijacks Plank, *Economic Times*, 17 December 1994.
- Phadnis, C Cargill Seeds a Sell out, *Business Line*, 15 November 1994.
- Seed Association of India, *Second Seed Seminar on Plant Variety Protection Pros and Cons* held at New Delhi 1989.
- Sinha, P.M. Plant Variety Protection and Patents: An Overview, *Proceedings of the Second National Seed Seminar* held at New Delhi, 1989.
- Siebeck, W. *Intellectual Property in Developing Countries*, World Bank Discussion Paper (112), 1990.
- Wijk, V.J., J.I.Cohen and J.Komen, *Intellectual Property Rights For Agricultural Biotechnology*. ISNAR Research Report No 3. October 1993.

