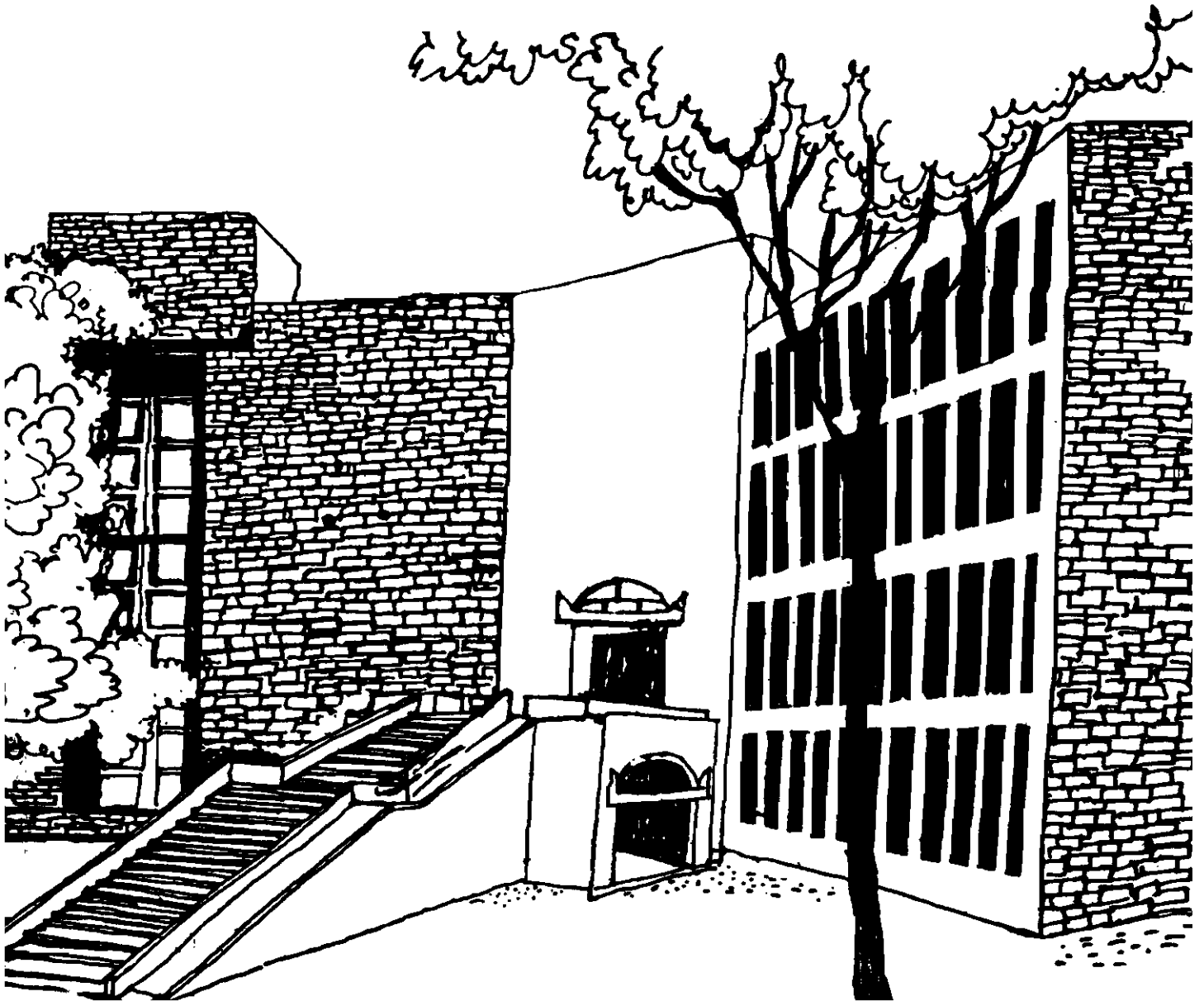




# Working Paper



IMPLICATIONS OF WTO FOR INDIAN AGRICULTURE:  
THE CASE OF INTELLECTUAL PROPERTY RIGHTS  
AND EMERGING BIOSAFETY PROTOCOL

By

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## **Implications Of WTO for Indian Agriculture: The Case Of Intellectual Property Rights and Emerging Biosafety Protocol<sup>1</sup>**

Abstract

*Globalisation in trade and investment through harmonisation of national laws, particularly dealing with intellectual property rights is one of the major impacts of GATT/WTO. The contribution of knowledge as a factor of production is being increasingly given central importance in economic development. The tension between public need and private control that will mount the first challenge. The conflict between chemical intensive agriculture (despite declining productivity of inputs) and the non-chemical sustainable technological innovations generated by farmers as well as firms (national or international) will pose second challenge. The increasing trend towards larger areas under fewer varieties and the need for food security through diversified biological systems will be the third source of conflicts. Production, protection, commercialisation and incorporation of intellectual property in development of national developmental strategies, will be crucial in defining the role India will play in world markets on one hand and overcoming deprivation and hunger with in the country on the other.*

*The strategy proposed is aimed at making Indian agriculture not only globally more competitive but also domestically more progressive by using knowledge as a strategic resource so that agriculture sustains livelihoods of millions of households dependent upon it in an environmentally sustainable manner. The major contention is that India should not view the challenges posed by WTO as if it will remain always an importing country and that it has no substantive intellectual property to offer to world market. There must be a registration system for encouraging protection of local land races and incentive system must be generated for in situ conservation. The provision of TRIPs need to be strengthened to include (a) micro organisms but exclude life forms, b) registration system of grassroots innovations (unlike utility patent system, this registration system should be like product patent for ten years just as proposed in Australian Innovation patent system) (c) widespread patent search facility for educational and entrepreneurial networks and centres so that quality of research and education can be competitive, (d) just as a global registry has been proposed for wines under TRIPS, India must insist that similar global registry must exist for green small innovations too. This will help link innovation, investment and enterprise each vector of which may be in different parts of the world. The global trade regime has to deal with several related issues in regard to biosafety such as ability of the importing country to assess the risks and deal with them, regulations for labelling or GMO products so that consumers can make informed choice, restrict GMOs which may pose hazard to the very viability of the food security, for example, through terminator gene technology, etc. Prior informed consent of farmers must be ensured while pursuing on farm trials on transgenics. The reciprocity in effective protection must exist i.e., (a) those who access farmers varieties must disclose, acknowledge and undertake to provide reasonable share of their revenue with germplasm providers/conservators through appropriate institutions, and (b) PVP/patent claimant should unambiguously prove that the materials in which improvements have been made, had been obtained lawfully and rightfully.*

## **Implications Of WTO for Indian Agriculture: The Case Of Intellectual Property Rights and Emerging Biosafety Protocol**

Anil K Gupta

### **Context**

Globalisation in trade and investment through harmonisation of national laws, particularly dealing with intellectual property rights is one of the major impacts of GATT/WTO. The contribution of knowledge as a factor of production is being increasingly given central importance in economic development. The management of knowledge not in just in farms and firms but also in non-farm sector will become very crucial in coming years. The intellectual property rights deal with the reciprocity in rights and responsibilities of inventors and society at large. In lieu of the disclosure of the patented innovation or invention, the society agrees to recognise the right of inventor to exclude others not authorised, from commercial exploitation of the invention. It is a kind of social contract between society and the inventor. Society gains by getting access to the inventive process and product, which can be used by other inventors for making improvements as well as developing substantive new innovations. Inventor benefits by having incentive to invest himself/herself or assign it to some one else interested in commercial exploitation of the invention. If others could easily copy the invention as often happens in the case of process patents, then investors will not make major investments and inventors will have no incentive to disclose. The plants and animals were kept out of the purview of patents when the concept was developed initially. However, in fifties, discussion started on finding out ways in which more plant varieties could be developed and breeders could be given incentives to innovate and disclose the improvements.

The *sue generis* system created for protection of new varieties of plants by International Convention for Protection of New Varieties of Plants (UPOV) was a response to basically three factors (UPOV 1998), a) reluctance in fifties to the application of patent systems to agriculture and to the plant breeding in particular, (b) realisation that a system was needed to protect plant varieties somehow to also safeguard the interests of the breeders. And (c) the conditions of patentability might not be appropriate for the plant varieties. Subsequently, the 1961 Act was modified in the 1978 which was further modified in 1991. After ratification of 1991 Act by more than six countries, it has come into force now.

While TRIPS (**Trade-related Aspects of Intellectual Property Rights agreement**) does not explicitly state that *sui generis* system should be compatible with provisions of International Union of Plant Variety (UPOV), it is implied that such should be the case. Earlier, the option for the countries joining UPOV was to have their national laws compatible with UPOV 1978. However, after coming into force of UPOV 91, such an option does not exist for countries, which have not sent their draft bill to UPOV for reference. Although, this is a contentious issue. Many countries including India have argued that providing "effective" plant variety protection through 'sue generis' system need to mean parity with UPOV 91. Increasing use of biotechnology in producing

transgenic crop varieties and genetically modified organisms (GMOS) also requires development of biosafety norms to regulate trade in such crops, animals and products. As much as sixty per cent of the marketed products in some commodities have biotechnological inputs in some of the developed countries. A significant part of it involves transgenic crops particularly in USA.

Indian government has not yet enacted either a sui generis system or a Plant Variety Act which is in conformity with WTO provisions.<sup>a</sup> However, author has had access to the new Plant Variety and Farmers' Rights Bill which is quite unique in many respects and has been summarised in third part.

It is author's contention that we cannot hope to make our agriculture self-reliant if the public sector agricultural research remains totally under the stranglehold of government. It should have autonomy and be much more accountable to various user groups. Such will continue to be the case till R&D institutions primarily rely on government for funds. It is obvious that public sector R&D has played a very crucial role in agricultural growth in the country. The tragedy is that even well off beneficiaries of this growth did not share any part of their economic gains with the R&D institutions. So much so that Central and state seed corporations never paid any revenue to the research institutes and universities. WTO implications will force agricultural R&D and trade sectors to become more efficient and competitive. Intellectual property rights protection for public and private sector scientists as well as institutions is likely to contribute to this process.

This paper deals with the experience of different countries which have enacted plant variety protection Acts and have tried to cope with biosafety norms as a consequence of increasing role of biotechnology in development and transfer of agricultural products, seeds, animal breeds. The lessons for Indian policy and options for future negotiations are mentioned in the end.

## **Section 1: Introduction**

The contribution of knowledge as a factor of production is beginning to acquire dominant role in future trade, investment and technological change in agriculture as well as other sectors of economy. The management of knowledge not just in farms and firms but also in non-farm sector will, thus, become crucial. But the production and reproduction of knowledge will no more be governed by the conventional norms of public space, scrutiny and substantive needs. It is the tension between public need and private control that will mount the first challenge. The conflict between chemical intensive agriculture (despite declining productivity of inputs) and the non-chemical sustainable technological innovations generated by farmers as well as firms (national or international) will pose second challenge. The increasing trend towards larger areas under fewer varieties and the need for food security through diversified biological systems will be the third source of conflicts.

The strategy proposed is aimed at making Indian agriculture not only globally more competitive but also domestically more progressive by using *knowledge* as a strategic resource so that agriculture sustains livelihoods of millions of households

dependent upon it in an environmentally sustainable manner. The major contention is that India should not view the challenges posed by WTO as if it will remain always an importing country and that it has no substantive intellectual property to offer to world market. The critical NGOs and other colleagues who criticise the concept of intellectual property rights have perhaps not been exposed to the inventive potential of Indian society. Honey Bee network has demonstrated over last ten years through its data base having about ten thousand entries of innovations and outstanding examples of traditional knowledge, innovations and practices, the immense contribution that grassroots innovators can make towards this cause. Add to this the potential that Indian scientists have and one would know why TRIPs under WTO can indeed make R and D in formal and informal sector as the pivot of socio-economic transformation of our society. It is true that India must negotiate changes in TRIPs to suit our requirements. But we can lobby for these changes because we are part of WTO.

## **Section 2: Trade-related Aspects of Intellectual Property Rights System (TRIPS)**

The Indian patent law is under review for bringing it in conformity with WTO provisions. A particular part of Article 27 mentioned below has direct implications for agriculture. Even the product patent aspect will have implications for agriculture by way of protection to the inventors of new agricultural products. Since processes are easy to copy, product patents are necessary.

The provision of TRIPs need to be strengthened to include (a) micro organisms but exclude life forms, b) registration system of grassroots innovations (unlike utility patent system, this registration system should be like product patent for ten years just as Australian innovation system has been proposed, (c) widespread patent search facility for educational and entrepreneurial networks and centres so that quality of research and education can be competitive, (d) just as a global registry has been proposed for wines under TRIPS, India must insist that similar global registry must exist for green small innovations too. This will help link innovation, investment and enterprise each vector of which may be in different parts of the world. More on that later.

A review of clause (b) of para 3 of Article 27 of the TRIPS Agreement is due in the year 1999. This part of the Article states as under: -

“Members may also exclude from patentability:

- (b) Plants and animals other than microorganisms, and essentially biological processes for the production of plants or animals other than non-biological and microbiological processes. However, Members shall provide for the protection of plant varieties either by patents or by an effective sui generis system or by any combination thereof. The provisions of this subparagraph shall be reviewed four years after the entry into force of the WTO Agreement.”

Three permissible exceptions to the basic rule on patentability:

- i. inventions contrary to ordre public or morality. This explicitly includes inventions dangerous to human, animal or plant life or health or seriously prejudicial to the environment. The use of this exception is subject to the condition that the commercial exploitation of the invention must also be prevented and this prevention must be necessary for the protection of ordre public or morality.
- ii. diagnostic, therapeutic and surgical methods for the treatment of humans or animals.
- iii. plants and animals other than microorganisms and essentially biological processes for the production of plants or animals other than non-biological and microbiological processes. However, any country excluding plant varieties from patent protection must provide an effective *sui generis* system of protection.

The knowledge and activity of breeders is sought to be protected more vigorously. It has to do so by protecting the public sector research and development (much of which unfortunately has become weak over the years) but also create environment for promoting (a) farmer led research, (b) farmer and scientist partnership in research, and (c) private and public sector collaboration in research.

Basic purpose of UPOV is to ensure national treatment for any breeder of the world at par with domestic breeders. The UPOV 1991 as the UPOV documents show (Jan, 1999), tries to achieve the following:

Article 14(1)(a) of the 1991 act made the breeders' rights more precise. There is a view that inclusion of "conditioning for the purpose of propagation" does not extend the breeder's domain (since conditioning is just one step in the chain of developing propagation material) but instead makes his rights enforceable.

By extending the breeder's right under article 14(2) OF 1991 ACT, UPOV 1991 act to harvested material where 'breeder has not had enough opportunity to exercise his right in relation to the propagating material'(1999). Infringement in some cases may become apparent only when the harvested produce comes into market though one has to prevent absence of diligence in prior scrutiny and objection. It also means that import of harvested material can also be protected both by way of collection of royalty and safeguarding the interests of national licensed producers.

The provision of compulsory licensing can of course be invoked in the event of special national interests.

Farmers' Privileges can be protected in terms of rights to save seed, exchange it for non commercial purposes.

The issue here is that Indian breeders will need all these protections in other countries. The mind set where we evaluate every thing from an importers' perspective must change.

### **Section 3: Methodology:**

The Plant Variety Acts of thirty five countries excluding India, both developing and developed have been reviewed. In addition various debates have been covered to (a) identify the unique features evolved by different countries to protect the intellectual property produced in their own country, (b) mobilise the useful technologies from abroad and (c) protect their rights in other countries. While biosafety is only one sub set of environmental regulations, a very brief review of some of the environmentally induced disputes in international trade in agriculture is presented so as to draw lessons for trade policy in agriculture. However, the detailed implications are drawn only for biosafety which has the potential to influence biodiversity and genetic wealth adversely if not regulated adequately. To the extent WTO requires national treatment for global trading partners, it is important to recognise that regulations for international exporters of transgenic crop or animal technologies to India will have to be applied to domestic biotechnological companies and research groups also. Labelling of food or food products based on output of transgenic crops is becoming a very serious issue in Europe and USA is also likely to accept this demand of EU. The import of unlabelled transgenic crop based food items is either completely baned or strongly restricted in EU as well as Japan. US Secretary of Agriculture, The possibility of bridging the gap in global and national domestic technological competence is smallest in case of biotechnology compared to all other fields of industrial technologies.

### **Section 4: Some of the issues that need to be addressed in future are:**

- a) The rights of local communities and farmer breeders in land races as well as recent improvements in these land races, could be a major source of stability in food supply in the wake of fluctuating climate and other environmental conditions. The incentives for decentralized breeding by farmers on their own, with or without partnership of scientists will help make the goal of generating diversity in genetic base a realizable goal. A registration system of land races will have to be developed to recognise the community rights in these races. Indian Plant Variety and Farmers' Right Bill (henceforth, Indian PFRB), makes a very bold attempt in this direction which has not been tried by any other country whose PVP bills has been reviewed here.
- b) Monetary as well as non-monetary incentives for individuals as well as Communities as advocated by Honey Bee network and SRISTI for last ten years are essential if the asymmetry in the rights of institutional and informal breeders has to be reduced and eventually eliminated. Without wider participation in production of intellectual property such as plant varieties, a diverse country of India's size can not grow in a sustainable manner in future. France offers an interesting model in which small farmers' co-operatives dominate the seed industry instead of large multinational corporations. The



preference for taste by consumers can be harnessed for promoting decentralized co-operative and small scale entrepreneur based seed industry. The public sector research institutions will have to provide hand holding support to such co-operatives and entrepreneurs. There is no policy for encouraging small scale breeders. Recently when a farmer bred variety of groundnut , 'morla' (developed by Thakarshee bhai) was taken up by ICAR's AICRIP on ground nut, the NGO SRISTI had to arrange the seed required for multi location trials. Despite good intentions, the scientists concerned had no provision to pay for seeds of such small farmer breeders. This incidentally was the first time in last fifty years, that a farmer bred variety had been taken up for All India trials. Such cases must multiply and soon.

- c) There must be a registration system for encouraging protection of local land races and incentive system must be generated for in situ conservation. ten per cent of area under threatened land races may receive incentive price computed by productivity multiplied by price to equal similar productivity price equivalent of modern variety in that area. Thus a farmer selected through random lottery will be eligible for such an incentive only if he/she had grown land race. A national register must also be developed for other herbal innovations. The Indian PFRB provides for registration of not only extant varieties but also farmers' land races by communities or NGOs.
- d) National database on local varieties with systematic documentation of local knowledge of women and men is very necessary. For making our breeding system responsive to global demands, we must know which land races can offer genes for which kind of characters. Only agronomic evaluation is not sufficient. The local knowledge of farmers' families is very valuable but almost completely absent from passport sheets of ex situ gene banks. This is a task, which will pay dividend quickly if given high level attention.
- e) We have to create a Knowledge Network, which will connect creative farmers, scientists and policy makers in real time so that macro policy can be responsive to micro level innovations, and other urges.
- f) Sustainable Technologies: The Honey Bee data base demonstrates that productivity can be increased without impairing the environment and quality of outputs. Our exports are getting affected in some of the sectors by pesticides residues. National technology mission on non chemical technology development is must and this should not restrict its scope to innovations by formal centres of research alone. Informal innovations should also get the same attention.
- g) Demand for *organic food* and spices is increasing world over but we still do not have decentralized arrangements for certification by NGOs, and public sector research organisations (exceptions apart).
- h) We have to strengthen *phytosanitary control systems* to prevent import of diseases, pests, weeds etc., in the wake of liberalised import of seeds material

from abroad. Training of customs officials in this regard is necessary. They should also be trained to prevent clandestine export of restricted seed material out of the country. The export of soils samples without proper authorisation should also be prevented since patents already exist on microorganisms taken from soil from Gujarat and many other regions of the country.

### **Section 5: Biosafety Protocol (BP), Bioethics and Environmental implications of Trade in transgenics and forest products**

It is true that a proper BP may take some time to evolve as a consequence of debate in CBD (Convention on Biological Diversity). But there is an urgent need for constituting Ethics committees for overseeing the test on transgenics by domestic as well as international producers at the level of each research institute where such research is being done in the country.

The trade in GMOs (Genetically Modified Organisms) will need to be strictly regulated and for that capacities need to be created urgently. This will ensure that we attract investment in this sector with responsible regulatory system. Prior informed consent of farmers must also be ensured while pursuing on-farm trials on transgenics. Public notice must be given for all such trials and informed debate should take place on these issues rather than exposing people to only populist propaganda, as has been often the case.

There have been widespread protests in developed as well as developing countries about alleged insensitivity of WTO to the environmental and bioethical considerations. Some developing countries fear that developed countries may use environmental standards as protective barriers to import from developing countries. For instance, "International forest protection leaders from western countries have announced a global campaign to derail World Trade Organisation (WTO) plans to write trade agreements that they believe will threaten the world's forests at the upcoming WTO Ministerial meeting this November" (ENS, July 1, 1999). The coalition seems to have, "support within the U.S. Congress for its forest protectionist stance. Congressman George Miller, a California Democrat and Congressman Merill Cook, a Utah Republican, circulated a letter to their congressional colleagues in May that stated the threat to forests this way. The World Trade Organisation (WTO) is currently negotiating a new agreement on forest products. The agreement would eliminate tariffs on forest products in developed countries by the year 2000 and developing countries by 2003. In addition, negotiators are discussing the reduction of non-tariff barriers to trade. The agreement would expand the market for forest products without protecting domestic laws or encouraging sustainable logging practices or protecting endangered forests, ecosystems or biodiversity, the two lawmakers wrote. Miller and Cook want the Clinton administration to stop negotiating for trade liberalisation in forest products, at least and until a comprehensive assessment is conducted". Impact of reduction in tariff on wood consumption could be enormous. It could "increase by between three and four percent if tariffs came down world-wide, said Maureen Smith, vice president international of the American Forest & Paper Association".

While in this case, I would support this coalition because of its obvious concern for conservation, the policy makers may not see the situation in the same light. In the famous case of Tuna - Dolphin dispute between Mexico and US and, European Union and US, the WTO decision was also considered anti-environment by many NGOs and other policy makers in USA.

In Tuna-Dolphin case, the dispute arose from the trade sanctions that US proposed to impose on Mexico for import of Tuna fish into USA because Mexican vessels catching tuna fish were supposed to have made incidental catch of dolphins - a protected species beyond the permissible category. The case was decided in favour of Mexico (and also in favour of European Union which imported unprocessed tuna from Mexico and exported processed tuna to USA) because of two major reasons: (1) US laws requiring these sanctions cannot have extra jurisdictional application (the catch of fish was made in tropical pacific waters well outside the 200 miles zone of USA), (2) the application of US laws was discriminatory because it did not penalise US vessels catching dolphins along with tuna in other seas. The contention was that dolphin was not endangered only in pacific waters. The environmentalists felt that GATT was not green enough. On the other hand, developing countries saw this case as an example of fair treatment in the dispute settlement process of GATT/WTO because many developed countries intervened on behalf of Mexico.

The agricultural produce having pesticidal residues or other chemical residues have faced similar restrictions. The issue is that environmental considerations cannot work only one way. In this paper, I am dealing with primarily the implications of WTO on Indian agriculture from the point of view of TRIPS, UPOV, and biosafety measures. In the case of biosafety rules, the boot is on the other leg. Developed countries are complaining that the protocol being requested by developing countries under CBD is extremely restrictive, though on environmental grounds. India will have to develop its strategic position keeping in mind the arguments it wants to advance in the biosafety debate vis-a-vis its concern for non-tariff barriers in the form environmental standards being imposed by the developed countries.

More discussion on the environmental issues is beyond the scope of this paper. However, it is important to note that the Plant Variety Act providing for registration of transgenic crops would involve environmental, ethical and biosafety issues. It is in this context that the contentious nature of global opinion on the subject must be viewed.

## **Section 6: The Biosafety Regulations**

The biosafety regulations focus on the direct and indirect consequences of introducing genetically modified organisms (GMOs) or living modified organisms (LMOs) into the environment such as:

- a) What is the probability that the characteristics of the GMO may be transferred to the wild relatives of the species?
- b) To what extent the toxin producing or other genes introduced into the organism can be transferred to other organisms even unrelated.

- c) Whether consumption of GMO can cause any allergy or other health hazards?
- d) Whether the introduction of GMO can create new weeds, affect biological vectors or disrupt the ecosystem?

The global trade regime has to deal with several related issues in above regard such as ability of the host or importing country to assess the risks and deal with them, regulations for labelling of GMO products so that consumers can make informed choice, restrict GMOs which may pose hazard to the very viability of the food security, for example, through terminator gene technology, etc.

### **Section 7: Why Biosafety Regulations?**

The trade in transgenic commodities whether for research or commercial purposes involves various risks mentioned earlier. Lackey (1998) provides in table 1 latest scientific understanding of the hazards in transgenics

**Table 10.1  
Environmental Hazards In Transgenic Crops:**

#### **\* Modes Of Gene Escape In Rapeseed**

Genes of *B. napus* may be transferred out of the test area by seed or by pollen.

Seed is capable of germinating in subsequent seasons; therefore, some means of collecting all seed, preventing bird or other animal movement, and ensuring that in subsequent seasons transgenic plants derived from any shattering loss are destroyed.

Although the survival and maintenance of hybrids is relatively unlikely, plants receptive to *B. napus* pollen should not be in the area. Specifically, *B. napus* plants should not be within bee pollination range, and *B. rapa* or *B. oleracea* plants in flower should not be within the area during the period of flowering of the transgenic crop.

#### **\*\* Modes of Gene Escape in Corn**

Genes of corn may escape from the test plot in two ways. The first is by pollen transfer. The second is by movement of the grains.

If viable pollen of the transgenic plants can be transferred by wind to any receptive corn stigma within the 30 minute period of pollen viability, an escape of genetic material could take place. This potential transfer becomes more unlikely as distance increases from the transgenic plants, and from a practical standpoint becomes increasingly unlikely at distances much beyond the foundation seed isolation distance of 660 feet. Temporal isolation would further reduce the likelihood of effective pollination and fertilisation. In addition, any physical

impediment to this movement, such as effective detasseling or bagging, would completely eliminate the possibility of gene escape by way of pollen.

To prevent grain from remaining in the field or otherwise escaping, all ears would have to be collected or otherwise destroyed. To ensure that no grain escaped harvest, the field would have to be monitored for volunteer corn plants in the following season.

### **\*\* Modes of Gene Escape in Cotton**

Genetic material of *G. hirsutum* may escape from a test area by vegetative material, by seed, or by pollen. Propagation by vegetative material is not a common method of reproduction of cotton. Physical safeguards that inhibit the movement of vegetative material from the area should be adequate to prevent gene movement by this means.

Movement of seed from the test area can likewise be inhibited by adequate physical safeguards.

Movement of genetic material by pollen is possible only to those plants with the proper chromosomal type, in this instance only to those allotetraploids with AADD genomes. In the United States, this would only include *G. hirsutum*, *G. barbadense*, and *G. tomentosum*. *Gossypium thurberi*, the native diploid from Arizona with a DD genome, is not a suitable recipient. Movement to *G. hirsutum* and *G. barbadense* is possible if suitable insect pollinators are present, and if there is a short distance from transgenic plants to recipient plants. Physical barriers, intermediate pollinator-attractive plants, and other temporal or biological impediments would reduce the potential for pollen movement.

Movement of genetic material to *G. tomentosum* is more unknown. The plants are chromosomally compatible with *G. hirsutum*, but there is some doubt as to the possibility for pollination. The flowers of *G. tomentosum* seem to be pollinated by moths, not bees. And they are receptive at night, not in the day. Both these factors would seem to minimise the possibility of cross-pollination. However, Fryxell(1979) reports that *G. tomentosum* may be losing its genetic identity from introgression hybridization of cultivated cottons by unknown means.

People are worried about two kinds of risks from genetically modified organisms: risks to human health and risks to the environment - including all of the animals, plants and micro-organisms that inhabit the earth.

Risks to human health from micro-organisms used in contained industrial production laboratories are generally considered low. Few of the micro-organisms used in research or industry are pathogenic to humans. However, there is a risk that undesirable environmental effects could be caused by novel organisms released into the environment. Some of these effects may be difficult to predict accurately or may only be apparent in the longer term, but all the available knowledge must be used to enable us to take adequate precautions.

### Risks for the Environment by the GMOs

1. Excessive increase in the numbers of organisms released to the environment, and their establishment
2. Direct but unanticipated effects on non-target species - infectivity, pathogenicity, predation on other micro-organisms, plants and animals, or shifts in host range
3. Negative influence on the interactions among species - predators, prey, hosts, symbiots, etc.
4. Unanticipated involvement in biogeochemical cycles - nitrogen-fixation, mineral cycling etc.
5. Transfer of undesired characteristics to other organisms.

These depend on a series of events:

1. Incorporation of a gene for a particular trait into an organism
2. Deliberate or accidental release in the environment
3. Survival and multiplication of the organism in the environment
4. Contact with species or ecosystems which can be injured by the organism
5. Harm to the species or ecosystems.

Notwithstanding the claims about safety of food produced through transgenic crops, the protest movements around the world are calling for change. In USA last year, it is estimated that 40 per cent of Soya and 30 per cent of corn was genetically engineered. FDA's claims that food produced through such crops was no different from the rest is being questioned through law suits in USA. It is extremely necessary that India takes up systematic research programs to assess these contentious issues. To see close connection that exists between biosafety, transgenics and intellectual property rights, a news from Nature will help. Gregory Aharonian, (patent-news@world.std.com, July 15, 1999) quotes a letter in Nature (June 5, 1999) providing concentration of plant DNA patents:

A group in London reports that from 1980 to 1996 about 600 plant DNA sequence patents were applied for, about half granted. About half were filed by multinationals, the largest number applied for by Monsanto with 69 applications, followed by Zeneca and Novartis. About fifteen percent were owned by the US government. Maize was the mostly heavily patented, and the genes involved dealt with nutrition (20%), pathogen resistance (20%) and gene regulation (18%).

A recent UNDP publication observes ( UNDP, 1999):

In biotechnology genetic engineering underlies the new direction of pharmaceuticals, food, chemicals, cosmetics, energy and seeds. This is blurring the boundaries between the sectors, creating mega "life sciences" corporations. Indeed, across all knowledge-intensive industries, a select

group of corporations controls ever-growing shares of the global market. In 1998, how much of the global market did the top 10 corporations in each industry control? In commercial seed, 32% of a \$23 billion industry; in pharmaceuticals, 35% of \$297 billion; in veterinary medicine, 60% of \$17 billion; in computers, almost 70% of \$334 billion; in pesticides, 85% of \$31 billion; and in telecommunications, more than 86% of \$262 billion. The lesson is clear: privatisation does not automatically lead to competition.

It is obvious that transnationals hold sway in this field. To avoid dominance of transnationals in international trade, India will have to negotiate sufficient safeguards, flexibility on behalf of small innovators as distinct from local communities conserving land races—a rich resource for future plant breeding and biotechnological applications—and at the same time create good domestic examples. The greatest weakness of Indian position is that India has not created any concrete example in its domestic policies as yet which can be taken as evidence of its intentions and genuine interest in safeguarding the interest of local communities conserving land races or individual farmers developing new varieties. For instance, it could levy a small tax say, 50 paise per quintal at market yards in green revolution regions as mentioned herein later, and use it exclusively for improving livelihood options of tribal and other farmers pursuing in situ conservation of agro-biodiversity. Likewise, patent laws enabling small innovators to get limited duration, say 10-15 years, product patent protection at very low transaction cost will go a long way in creating constituency for stronger intellectual property in the country. Likewise invention promotion funds and incubators to convert innovations into products and services will have to be created all over the country. Many of the measures suggested in the draft National Biodiversity Bill (author was a member of the drafting working group which finalised a reasonably fair treatment of domestic and international bioprospectors) try to achieve this goal. Unless voluntary co-operatives of seed producers and farmer breeders are given encouragement by state, dominance of large corporations can not be avoided. Likewise scientists in public sector must be encouraged to participate in private sector so that two-way flow of knowledge, skills and perspectives takes place apart from marriage between the respective strengths. Tendency to see private sector always with suspicious eyes will affect adversely the growth of both.

#### **Section 8: Highlights of Indian Plant Variety and Farmers' Right Bill, 1999**

- a) The Indian government has preferred to use sue generis system instead of patents because of three major advantages: a) flexibility, b) better protection of farmers' rights, and c) stronger researchers' exemption.
- b) The Indian Draft Bill on Plant Variety and Farmers' Rights provides for the option of compulsory licensing when reasonable quantity of seed or reproductive material of protected variety is not made available in the country.
- c) Government has the power to determine which genera and species would be covered under the Plant Variety Protection.

- d) In case of any disputes regarding orders of Indian PVFRB Authority, the high courts will have the jurisdiction for resolving any complaints.
- e) Clause 25 of the Bill has a provision for non-registration of the varieties which are injurious to the public morality or health as in the case of 'terminator gene'.
- f) There is a provision of setting up gene fund, which will determine the share of benefits to be given to farmers or other breeders and also decide the eligibility for getting benefits, whether benefits are given one time or on recurrent basis.
- g) There is a provision for registration of extant varieties, i.e. the ones notified under Seed Act, 1966 released by the Central Seed Committee. The provision also exists for preservation jointly or severally of wild species or a traditional variety with or without added value and which has economic use.
- h) The farmers rights include the right to i) produce his crop, ii) use product of crop as seeds for producing further crop, iii) sell product of crop except its sale exposing it as a seed.
- i) The new varieties are supposed to be those varieties, which have not been grown earlier than one year outside India and in case of trees and vines not earlier than six years. In all other cases, the limit is four years.
- j) The distinctiveness of the variety is defined by its distinguishability by at least one essential characteristic from any other variety whose existence is a matter of common knowledge in any country at the time of filing of application. Failure of an application for the grant of breeders right to a new variety or its derivatives shall deemed to render that variety as a matter of common knowledge.
- k) The applicant is required to provide complete passport data of the parent line from which new variety or its propagating material has been developed.
- l) The duration of protection is 18 years for trees and vines and 15 years in the case of extant varieties and 15 years for other crops except extant varieties in which 15 years will be calculated from the date of notification by the government under the Seed Act, 1966 or from the date of release or date of registration as a farmers' variety whichever is earlier. The validity of farmers varieties particularly land races should actually be at least be 99 years instead of only 15 years. This clause needs to be modified in the Indian bill.
- m) Gene Fund: Breeder will deposit in gene fund the amount determined by the authority. In case of default, this amount can be recovered as an arrear of land revenue.
- n) The breeder will be required to deposit appropriate quantity of the propagating material.
- o) Researchers Right: Authorisation of breeder or plant variety protection holder is necessary when repeated use of parental lines of a variety is required. Otherwise nothing will prevent any researcher from using a protected variety as a research material.



- p) **Farmers right:** Farmers has the right to save, use, exchange, share or sell his farm produce of a protected variety except when covered by contractual market arrangement.
- q) **Rights of communities:** People of any community or an NGO representing them can represent the contribution of people to a variety granted protection under the Act. The authority would very such claims. And if found valid, compensation would be paid to NGO/people who submit claims of people against which existing breeder/s enjoying protection would be heard and given notice. The compensation granted by the breeder will be deposited in the gene fund. The NGO or the community shall withdraw the compensation even if such a fund has not been deposited by the breeder concerned in the gene fund. The compensation shall be recovered from the breeder in case of default as an arrear of land revenue.
- r) **National Gene Fund:** The functions of national gene fund are, i) benefits sharing in the prescribed manner, ii) royalty paid at such rate as may be prescribed by the central government on the sale price of the seed or propagating material of a registered variety, iii) contribution from national or international organizations can be received in the gene fund.
- s) All plants under the order Plantae are included for protection except micro organisms.

As mentioned earlier, the Indian PVFRB has many unique features such as opportunity for registration of extant varieties, registration of farmer's traditional varieties by communities of NGOs on their behalf, constitution of National Gene Fund though it aims to collect revenue mainly from seed companies only- a point that we will like to critique.

## **Section 9: Findings and recommendations for change**

1. *Definition of variety(See Annexure I) :* A variety must fulfil three criteria to be called as a particular variety, (a) it should be possible to describe the member plants through a common descriptor, (b) a distinguishing feature or features by which one can distinguish one variety from another criteria, i.e., distinctiveness, uniformity, and stability (DUS) corresponding to point 'b', 'a' and 'c' respectively mentioned above. The requirement of DUS prevents buffering population of land races, heterogeneous in nature to be protected. One way to circumvent this constraint will be to require the condition of stability be met over four or five generations rather than in every generation. Multi line varieties developed for rainfed regions would have to have the capability to deal with too much rain or too little, likewise early rain versus little delayed. The definition of uniformity and stability would thus require modification. The narrowness of genetic base has already been recognised a major threat to food security in most countries. The DUS conditions will only make the situation worse. The definition of the plant also varies a great deal from country to country. Australia includes in "**plant**" all fungi and algae but does not include bacteria, bacteroids, mycoplasmas, viruses, viroids and bacteriophages. Whereas New Zealand includes fungus but excludes alga or bacterium. India will have to decide the spectrum of

protection it needs to provide. In my view, it is better to accept Australian definition since it is closer to the accepted scientific perspective.

2. The inclusion of 'discovered wild plants' in the definition of variety by China, and France which can be protected provided these had DUS property, offers an interesting possibility. This implies that a wild plant, which has just been characterised as DUS such as medicinal, plants, or even crop or horticultural plants can be covered under protection and entitle one to breeder's privileges. This is akin to the privilege provided in the patent act for microbial organisms found in nature but isolated and characterised to become eligible for protection. The exclusion norms for product of nature stand thus modified. The issues are more pragmatic than moral because domestication process in the long past had generated the land races in the first place. Similar domestication must continue now to meet future food needs and reduce dependence on a very narrow range of food crops as at present. Whether such an activity should be rewarded or not is the issue to be decided. If it is rewarded, it is likely to take place more aggressively otherwise it might suffer. I have no doubt that only monetary rewards are not the most potent force in generating human motivation for a desired action. However, it is also true local communities and individual farmers only should not be expected to contribute on voluntary basis when every other section of society clamours for monetary gains.
3. Under the UPOV 1991, the varieties, which are different only in one or very few characteristic compared to the existing protected varieties, are called as 'essentially derived varieties (EDV)'. This is done to avoid cosmetic breeding by which someone can usurp a breeder's right by merely changing colour or shape of a leaf or any other non-economic part of a plant. In the case of EDV, the permission of the breeder having the rights to the parent material is necessary. Some activists have opposed this provision suggesting that it inhibits the breeding process - a contention which is not true. It merely makes the rights of those who make substantive investment in research evident and more significant. In Italy, PVP act requires that if repeated use of an existing variety is required for developing protected variety, then that variety should also be disclosed while filing PVP application. It is a very useful clause and has been incorporated in Indian PVFRB also.
4. Just as the rights of those breeders who make selections in the locally existing agro biodiversity are protected under the UPOV Convention, the rights of the farmers who have bred and selected the local land races should also be protected. FAO undertaking on Farmers' Rights has been on the table for more than a decade without any funds flowing into the kitty. One reason could have been that no developing country has cared to establish such funds even nationally. The argument cannot be that only the international (read western) corporations or institutions need to pay into this or any other such fund while the seed companies and beneficiaries of green revolution in developing countries need to have no reciprocity towards the conservators of land races. I have argued that a one to two percent cess on the transactions in market yards in green revolution regions and cash crops should be used for generating funds for conservation and recognition of farmer's varieties. This fund can also be used for providing incentive price to ten per cent of the conservators of land races selected through a lottery every year. This price can be determined by

finding out the difference between the price and yield of a land race and a high yielding variety suitable for the local area. Since only those farmers will be eligible to participate in the scheme who have grown land races, the leakage of the benefits can be avoided. This scheme can be started for those land races which are under threat of extinction. This will promote in-situ conservation and also provide incentives for agro biodiversity to be maintained. The cost of the seed should not increase (as it is likely to under current arrangement) such that already low replacement ratios further decline. Seed industry should certainly be required to make contribution to gene fund for ex situ conservation and to some extent for in situ conservation. However, the major contribution should be through the imposition of a small cess of fifty paise per quintal on market arrivals in green revolution high growth districts. This cess fund should be used exclusively through Gene Fund for providing incentives to small farmers growing landraces in marginal environments.

5. The public sector and private sector R&D institutions should also be encouraged to set up their own Gene Funds from the royalties of the varieties licensed by them to the seed companies. The brand equity of public sector R&D institutions should be protected through trade mark protection and royalties on the same should be charged, for instance, to every user of 'Pusa' brand name.

Public sector R&D institutions should be encouraged to set up joint sector companies with equity participation from the workers, scientists and other investors. The protection of intellectual property rights will require appropriate institutional innovations for enforcing the same. Without such a protection, they will not be able to set up corporate gene funds.

6. The coverage of protection under UPOV 1978 Act was minimum of five plant genera or species after joining and twenty four after eight years. In UPOV 1991 a minimum of five on joining and must protect all genera and species after ten years. India may have to consider a middle ground. The basic purpose of including any genera or species is to recognise and promote the research and development in that species. It is always possible for a country to refuse protection to any variety if it violates moral order or public safety.
7. The inclusion of 'conditioning for the purpose of propagation' in Article 14(1)(a) of the 1991 Act does extend the right of the breeder. However, both the conditioning and stocking are processes unrelated to the basic genetic property of the organism. Only in some cases can conditioning be closely related to the propagability of a variety (particularly in some of the horticultural crops or in seeds which have high dormancy and where dormancy has to be broken by some type of conditioning). Indian law can exclude these provisions and argue that breeders' rights will still be enforceable.
8. Another extension under the breeders' right provided in the UPOV 1991 is under Article 14(2) to cover harvested material. Thus if a breeder has not exercised his rights to propagating material or a standing crop, his rights don't cease to operate once the crop is harvested. This makes sense from the point of view of enforcement of breeders' rights on domestic and imported harvested material. Therefore, if

somebody grows seed of a particular protected variety seed outside the country and then imports that seed, he will still be obliged to take the permission of the breeder and/or pay royalty to him.

9. The period of protection (Annexure II) varies from fifteen to twenty years for crops and eighteen to twenty five years for asexually propagated horticultural crops. We may follow twenty and twenty five years as the duration for the purpose.
10. The farmers' privileges are left to the discretion of each country. Whether farmers can be allowed to produce seed for use on their own farm in the next growing season is a subject that is covered by Art. 15(2) which requires the rights of the farmers to be, 'within reasonable limits and subject to the safeguarding of the legitimate interest of the breeder'. To all farmers having holdings less than 20 or 30 hectares, the privilege must extend without any restriction. However, holdings larger than that also may not be required to pay royalty to the breeder for sale of seed across the fence without using brand name. In the Plant Variety Act of Zimbabwe, there is a provision that a farmer cultivating less than ten hectares of land will not infringe the breeders right if he used the saved seed from previous cycle of protected variety for propagating purposes on the said land or if he has modified the variety to be called as essentially derived variety. By implication, the farmers having larger holdings will not have this privilege. The Plant Variety Act of Venezuela provides for "farmers privileges" in Art.26, "anyone who stores and sows for his own use, or sells as a raw material or food, the product of his cultivation of the protected variety shall not be thereby infringing the breeder's right. This Article shall not apply to the commercial use of multiplication, reproductive or propagating material, including whole plants and parts of plants of fruit, ornamental and forest species". The proposed Indian Bill permits farmers to retain, exchange and sell seed without using brand name but without any quantity restrictions. This will permit the large estates and big commercial farmers to escape the responsibility of sharing the royalty with the breeder. Alternatively the seed companies may increase the price of the seed to recover their costs within one cycle of sale and in the process exclude small growers from the access to seed. Still another implication could be that private seed companies might not invest resources for improving self-pollinated crops because of the above constraints. A society has to decide whether the privileges to all classes and in equal measure will promote the long-term interest of productivity and incentives for R&D.
11. To prevent biotechnologically produced varieties to take away the benefits of conventionally bred varieties by transferring one or a few genes into or from the same, the concept of essentially derived varieties has been developed. However, EDV does not deal with incorporation of gene from a protected variety into an unprotected variety. The fact that conventional breeding by farmers or plant breeders made the expression of a particular critical gene possible has to be recognised. Therefore, the claimant for plant variety protection for a biotechnologically produced variety should disclose the source parents and must agree to contribute part of the gain with the breeders of the source variety.

12. Under the UPOV 1991 a provisional protection is mandatory. It enables a breeder to benefit from the commercialisation of his variety soon after filing of the application. However, in the case of patent, the protection is been available only when the patent has been sealed. We should evaluate whether India will benefit by providing mandatory protection from the date of filing application as called for in UPOV 1991. The advantage is that it helps in providing access to farmers to a new technology quickly. The harm is that for transgenic or other such varieties which may need to be evaluated for their environmental and other impacts, a quick protection may lead to avoidable hazards. My proposal is that all varieties which involve transgenic technology must require regulatory trials under contained conditions, no matter whether protection is sought or not. However, for other varieties where there is no likely hazard immediate protection can be provided.

13. The sui generis system is expected to provide effective protection for the plant varieties and, as in some countries, animal breeds. Majority of the countries who have enacted the Plant Variety Protection Laws after 1995 have tried to bring harmony with 1978 Act, except in few cases where provisions of 1991 have been drawn upon. India may like to incorporate the provision for protection of animal breeds in a combined Plant Variety, Animal Breeds and Farmers Right Act. Korea is one such country which gives the holder the right to produce, propagate, process, assign, lease, export, import or display the protected variety. This is a very sweeping range of rights. This is a very contentious issue and Indian position in the next round of discussion on TRIPS in 2000 should require discussion on *(a) reciprocity in effective protection, i.e., those who access farmers' varieties must disclose, acknowledge and undertake to provide reasonable share of their revenue with germplasm providers/conservators through appropriate institutions, (b) need for PVP/patent claimant to unambiguously prove that the materials in which improvements have been made, had been obtained lawfully and rightfully.* The first requires compliance with international and national laws and second requires moral responsibility of not taking something (without due consideration) from someone who is not aware of its true worth, (c) the breeders will be able to exclude large farmers and estate owners from the privilege of keeping one's own seed for perpetual use, (d) the breeder should also undertake responsibility that the variety will demonstrate under farmers' conditions, the characteristics that it is claimed to have. Breeder can specify the range of agro climatic and management conditions in which this will happen. Failing in this, the breeders will be liable for prosecution.

The effective protection has to be reciprocal, i.e., for the breeder as well as for the farmer. There is an argument that farmers' right to performance of seed as per the claim should be covered by Seed Act rather than by PVP Act. There is merit in this argument because Seed Act is aimed at dealing with provision of quality seeds in sufficient quantities to the farmer. The disadvantage is in the asymmetry in the rights of those who claim protection for certain attributes of a variety and those who buy these variety precisely for those characteristics.

14. Each of the word in Art.27.3b of TRIPS may come up for discussion during the next round of WTO meeting on the subject. The key words involved in this Article (Tanscy, 1999) are: plants, animals, micro organisms, essentially biological process,

non-biological, macro biological, plant varieties, effective and sui generis system. The application of patent law is being demanded by developed countries to biological materials or processes such as DNA sequences that can express in the form of certain specific proteins, varieties, cells, hybrids and parent lines, transgenic plants, animals and processes. Correa (1998) fears that patenting of genes at the cell level might extend this scope of protection to all the plants which had the cell with the claimed genes. In fact this can happen even if only the genes are transferred without transferring the whole nuclei or cell. Some of the countries exclude materials found in nature, even if in isolated form. This will practically shut the door on the research to find microbial organisms performing specific functions. It is well known that a research to identify and isolate, purify and propagate the macro organisms of such kind is labour and capital intensive and therefore, benefits of such research may not flow to the countries where such protection is not available. Further, the growth of domestic biotechnology industry may also be hampered by such constraints. On the other hand, the current provisions of TRIPS in regard to micro organisms are totally unsatisfactory. For instance, several multi national companies have taken patents on antibiotics producing micro organisms isolated from soil samples taken from India and even acknowledged in the patent documents without any reciprocity for the country or the region from which these samples were taken. American Type Culture Collection Centre (ATCC) does not require the depositor of unique microbial culture to disclose (a) whether the material has been taken through prior informed consent, (b) whether its attributes have been shared with the country/community from where it has been taken and (c) whether it will be accessible to the researchers/communities for local applications in the providing region. India may like to pursue these ideas in the November 1999 round of discussion.

15. Several alternative drafts that have been circulated by voluntary organisations to replace the Plant Variety Act provide useful areas for discussion. What is ignored is that in an international law rights are reciprocal, i.e., the protection that Indian breeders may need in other countries, they are required to provide to others in our own country. Further, having become member of WTO, we cannot choose to develop a system suitable for our purposes which other countries find inhibitory or restrictive or not sufficiently comprehensive. While certain provisions such as requirement of novelty and exclusion of "common knowledge" are certainly worth elaborating (Ravi Shankar, 1999). The common knowledge could be obtained from oral, documented practice or from reference collections from ex situ gene banks and of course, from the official register of varieties. One cannot restrict common knowledge only to the official register of varieties. This is not to deny the need for developing such a register in due course to incorporate whatever knowledge one can collect from the people about the local land races. The present situation of the descriptors maintained by most gene banks in agricultural universities and ICAR institutions is not very helpful. In most cases, the name of the villages from where the seed was collected is not given, much less the name of the farmer/s. We have not come across any case where farmers' knowledge particularly that of women is given. The protection of such knowledge thus becomes difficult. The efforts by Honey Bee Network initiated ten years ago are an exception in this regard. Honey Bee Network has maintained with the help of Society for Research and Initiatives for Sustainable Technologies and Institutions, IIMA, other network members, editors of local language versions of

Honey Bee newsletter (in Tamil, Gujarati, Hindi, Kannada, Telugu, <http://csf.colorado.edu/sristi/>), a national register of innovations, new varieties developed by the farmers recently as distinct from land races. It is our contention that those who plead for restricting breeders' rights assume that commercially useful breeding can perhaps be done only by large corporations or international organisations – a contention which we strongly dispute. We have been campaigning for protection of intellectual property rights of the innovators for last ten years much before anyone else had raised these issues from the farmers' perspective. The key difference in our perspective and that of other NGOs (including the proposal of CoFaB, Convention of Farmers and Breeders) is that we believe in the need for stronger breeders right whether in the formal or informal sector. We also do not want to treat all the farmers alike. There is no reason why farmers particularly the bigger ones in green revolution region and other irrigated areas who have benefited from the blending of land races conserved in rainfed regions, should not share part of the benefits with the poor land race growing farmers in rainfed and mountain regions. These benefits will not flow unless the beneficiaries of the private and public sector breeding agree to pay a small contribution per hectare towards the conservation fund. This fund, as proposed earlier, will provide incentives to the grower of land races so that they do not stop growing land races either on account of continued deprivation, or on account of more remunerative alternatives. If growing land races for at least ten per cent of the farmers in every region is equally remunerative, land races will continue to be grown. Most opponents of Plant Variety Act and breeders rights have not explained the process and mechanism through which resources will be generated for providing incentives for inventive and innovative activities at farm, in firms and within India and abroad apart from in situ conservation. By reducing the period of protection these NGOs are essentially killing the goose, which may lay golden eggs if properly, regulated and nurtured. It is futile to expect governments in various developing countries to provide incentives for conservation to the growers of land races when most of them don't have the money even to pay salary to their staff. If incentives are not right, technological flow and investments will not take place.

16. While we strongly support the need for evolving mechanisms for protecting community intellectual property rights, we strongly question the assumption that such rights only belong to communities and not to individuals. Honey Bee database demonstrates with more than ten thousand innovations the fact that there are individuals who excel and innovate in reproducing if not producing traditional knowledge and also who produce contemporary innovations. The proposed Plant Variety and Animal Breed Act of India should provide incentives for individual farmers and local communities to register and seek protection on their results of innovative efforts. The high transaction costs involved in filing and obtaining the varietal and breed protection should be subsidised by the conservation fund as well as by Zilla Parishads and state legislatures
17. Trade and protected varieties and breeds particularly of transgenic nature will require strong biosafety regulations and implementation capacity of the regulations at various levels ranging from lab to the national level. It must however be remembered that much greater environmental damage takes place due to existing chemical pesticides compared to the possible damage that may be caused by a transgenic pest tolerant

crop. For a small farmer would certainly be benefited if he or she can buy seeds of transgenic crop at reasonable rate rather than taking huge loans for buying pesticides than in some unfortunate cases, committing suicides. NO technological change is cost less. The most dramatic genetic erosion, i.e., loss of area under land races took place through the evolution and diffusion of high yielding varieties in what is called as green revolution. It should not be forgotten that this revolution was ushered in by public sector, research and extension institutions and private seed companies had practically no role. If one looks at the current seed protection policies and programmes of public sector seed corporations at national and state level, one would notice a very narrow varietal base. It is not suggested here that involvement of private sector will necessarily correct these problems. But it is obvious that private seed company can only survive if it can produce something which is distinctive, stable, uniform and new – the objectives of Plant Variety Act. Likewise, the public sector research institutions have not been able to generate revenue from the sale of the seed that they develop to seed companies. So much so, even the brand name of 'Pusa' seed which generates tremendous advantages for seed companies selling IARI Pusa seeds, is not registered under trade mark Act.

18. Geographical Indications must be protected as has become so apparent after Basmati case. Since registration of wines, as said earlier will come up for review in 2000 as a part of TRIPS review, India must take up the need for developing global registry for (a) small green innovations( such as herbal pesticides, growth regulators etc., developed by farmers, artisans, local communities ), (b) geographical indications and (c) land races so that improper grant of PVP or patents ( as was done in Australia for Indian chick pea germ plasm accessed from gene bank of ICRISAT) does not take place.
19. New uses of existing varieties/medicinal plants should be provided protection to give boost to herbal research in India and at the same time coded knowledge in ISM (Indian System of Medicines) must be excluded from PVP as well as patent protection.
20. To integrate implications CBD, International Undertaking for Plant Genetic resources of FAO, and Committee on Trade and Environment under WTO, A working group must be set up by GOI so that or efforts in each of this forum are co-ordinated and synergised which obviously is not the case at present.

The measure suggested in this note imply a three pronged strategy to deal with the implications of WTO on Indian agriculture from the perspective of intellectual property rights, particularly Plant Variety Act: (a) make domestic inventive and innovative activity more buoyant at grassroots as well as at formal institutional level, (b) provide protection to breeders within the country and outside to trigger two way technological flow from and to India and (c) ensure through viable and effective farmer privileges and biosafety regulations that environmental, economic ethical, and efficiency gains are not compromised while enabling trade and technology transfer.



One should not look at India remaining as only a technology recipient country. With all the inventive potential that exists at different levels, India should become a leader in provisions of sustainable technologies around the world.

**Section 10: Key issues for negotiation:**

- a. The need for explicit recognition of farmer's privileges and farmer's rights in the sui-generis system.
- b. The need to harmonise the implications of CBD, CTE and international undertaking on plant genetic resources.
- c. Every patent and plant protection authority should be required to ascertain from the applicant seeking plant variety protection or product patent on herbal or agricultural product that the raw material and information used in the innovation has been obtained lawfully, rightfully and through prior-informed consent of the providing country and the communities.
- d. Just as there exists a proposal in TRIPS for negotiating global registry of wines, India should assert that a similar Global Registry for Grassroots Innovations is needed to include landraces, herbal products developed by small farmers alone or in collaboration with farmer scientists.
- e. In view of the impact of lower tariffs on deforestation, the discussion on forest products should be carefully pursued. Since India is unlikely to become exporter of forest products and will remain a net importer, the lower tariff will only mean lesser cost of production by domestic industry based on imported raw material. India may consider this position while negotiating.
- f. The environmental implications of international trade holds tremendous challenge in agriculture particularly in fishery sector where Indian exports may come up for restrictions due to unsafe handling of protected species, incidental catch of dolphins or other such issues. Since the conservation is a national priority, India should not oppose environmental regulations unless these were discriminatory vis-à-vis importing countries on standards or practices.
- g. The insistence on DUS for varietal registration should be modified to include distinctive but heterogeneous and stable over three to four generations particularly in marginal environments. This will help in the development of varieties with buffering population and multi line composition for rainfed regions.
- h. The exemption of small farmers from the restrictions to save, exchange or sell seed without using brand name may be incorporated in the revised Article 27(3b). Similarly, restrictions on varietal protection to varieties in common knowledge must be incorporated and penalty is introduced for such attempts.
- i. While plant varieties have been covered by UPOV, animal breeds are not covered by any such protection. This may be taken up for negotiation.
- j. The products of genetically engineered varieties must be compulsorily labelled to help consumer make informed choices. Further the biosafety implications must be also incorporated in the Plant Variety Act so that registration is under PVP is contingent on the satisfactory completion of biosafety and bioethical requirements.
- k. The provision for community intellectual property rights may also be negotiated along with the need for low transaction cost system for small farmer innovator.
- l. The new uses of an existing product are protected as use patents in USA but not in Europe. India may pursue this issue both domestically and internationally.

**m. International registry proposed earlier should also include geographical indication for varieties.**

**India should not negotiate with the mindset of perpetual importer but should also think of export opportunities for technology in agricultural sector.**

## **Annexure I**

1. **Federal Law on the Protection of Plant Varieties (Variety Protection Law), Austria**
2. **Plant Breeder's Rights Act 1994o. 110 Of 1994, Australia**
3. **Plant Variety Patent law, Republic of Belarus**
4. **Subregional Integration Agreement, Common Provisions on the Protection of the Rights of Breeders of New Plant Varieties , Bolivia**
5. **Protection of New Varieties of Plants Act, 1999,Canada**
6. **Plant Variety protection Law ,1997, Republic of Croatia**
7. **On The Rights Of Breeders Of New Varieties Of Plants, Law No. 19.342,Chile**
8. **Regulations Of The People's Republic Of China On The Protection of New Varieties of Plants**
9. **Decree No. 533 Of March 8, 1994,Introducing Regulations To The Common Provisions On The Protection Of The Rights Of Breeders Of New Plant Varieties Colombia**
10. **Decree Of The Federal Ministry Of Agriculture And Food Concerning The Implementation Of Certain Provisions Of Law No. 132/1989 Of The Collection Of Laws On The Legal Protection Of New Varieties Of Plants And Breeds Of Animals, Czechoslovakia**
11. **Plant Novelties Act No. 866 Of December 23, 1987,As Amended By Act No. 1107 Of December 21, 1994 , Denmark**
12. **Law On Breeders' Rights of August 21, 1992, Finland**
13. **Decree Concerning The Committee For The Protection of New Plant Varieties, France**
14. **Law On The Protection Of New Plant Varieties No. 70-489 Of June 11, 1970, France**
15. **Plant Varieties (Proprietary Rights) Act, 1980, Ireland**
16. **Implementing Regulations Of The Decree Of The President Of The Republic No. 974 Of August 12, 1975, On The Protection Of New Plant Varieties\* Consolidated Text Of The Decree Of October 22, 1976, As Amended By Decree Of February 26, 1986, Italy**

17. The Seeds and Plant Varieties Act , 1972, **Kenya**
18. Law On The Protection Of Plant Varieties, **Moldova**
19. Law on the Protection of New Plant Varieties, **Kingdom Of Morocco**
20. Seeds And Planting Material Act Consolidated Text Of The Act Of October 6, 1966,As Last Amended By The Act Of May 2, 1984 , **The Netherlands**
21. Plant Variety Rights Act 1987 ' Number 5 of 1987As Amended By The Plant Variety Rights Amendment Act 1990 Of August 1, 1990, And The Plant Variety Rights Amendment Act 1994, **New Zealand**
22. Act of March 12, 1993,Relating To The Plant Breeder's Right , **Norway**
23. Seed Industry Law of October 10, 1987, **Poland**
24. Ministerial Order No. 940/90\* Of October 4, 1990 As Amended By Ministerial Order No. 351/91of April 20, 1991, **Portugal**
25. Law On The Protection Of Selection Achievements\*(Of August 6, 1993), **Russian Federation**
26. Law On Plant Variety Protection, **Slovenia**
27. Law On The Protection Of Plant Varieties (No. 12/1975 Of March 12, 1975), **Spain**
28. Plant Breeders' Rights Law\* Consolidated Text Of The Law Of May 27, 1971, As Amended By The Law Of June 30, 1971, The Law Of August 24, 1977, The Law Of November 10, 1982, And The Law Of May 9, 1985, **Sweden**
29. Protection of New Plant varieties Act, 1996,**Trinidad and Tobago**
30. Plant Varieties and seed Act, 1964, **United Kingdom**
31. Plant Variety Protection Act\* As Last Amended By The Plant Variety Protection Act Amendments Of 1994, **United States Of America**
32. Law On Selection Achievements, **Republic Of Uzbekistan**
33. Subregional Integration Agreement , Common Provisions on The Protection of Rights of Breeders of New Plant Varieties , **Venezuela**
34. Regulations Relating To Plant Breeders' Rights, **South Africa**
35. Plant Breeders Rights Act, **Zimbabwe**

## ANNEXURE\_ II

### Definition of Variety as stated in the Plant Variety Protection Acts of Different countries

Three main requirements which have to be met before a **variety** can be considered as an entity -

1. A common descriptor for the member plants
2. A distinguishing feature or features
3. Reproducibility without change

COUNTRY	DEFINITION OF VARIETY
<b>AUSTRALIA</b>	<ul style="list-style-type: none"> <li>▪ <b>“plant”</b> includes all fungi and algae but does not include bacteria, bacterioids, mycoplasmas, viruses, viroids and bacteriophages;</li> <li>▪ <b>“plant variety means a plant grouping (including a hybrid):</b> that is contained within a single botanical taxon of the lowest known rank</li> <li>▪ <b>“process”</b> in relation to the reproduction of propagating material, of a plant variety does not include: the development of a cell or tissue or a plant part into a plant of that variety, or the growth of a plant into a larger plant of that variety,</li> <li>▪ <b>“propagating material”</b> in relation to a plant of a particular plant variety, means any part or product from which, whether alone or in combination with other parts or products of that plant, another plant with the same essential characteristics can be produced,</li> </ul>
<b>AUSTRIA</b>	<p>For the purposes of this Federal Law:</p> <ol style="list-style-type: none"> <li>1. <b>“Species”</b> shall mean species of plants and their groupings and subdivisions, including those characterized by a specific system of propagation or a specific final use,</li> <li>2. <b>“Variety”</b> shall mean a plant grouping within a single botanical taxon of the lowest known rank,</li> </ol>
<b>BRAZIL</b>	<p>Plant variety is the variety of any higher vegetable kind or species that is clearly distinct from other known plant varieties and belongs to a species useful to the farming and forestry complex .</p>

<b>BOLIVIA</b>	<b>Variety</b> : Set of Cultivated Botanical individuals that are distinguished by specific morphological, physiological, cytological ,and chemical characteristics and can be perpetuated by reproduction, multiplication or propagation.
<b>CANADA</b>	<p>“<b>new variety</b>” means a plant variety that complies with the requirements of section 4;</p> <p>“<b>plant variety</b>” means any cultivar, clone, breeding line or hybrid of a prescribed category of plant that can be cultivated;</p>
<b>CHILE</b>	<p>“<b>Plant variety</b>” means a plant grouping within a single botanical taxon, whatever may be the distinctive element, of the lowest known rank, which grouping, irrespective of whether the conditions for the grant of a breeder’s right are fully met, can be:</p> <p>“<b>Propagating material</b>” means seed, fruit, plants or parts thereof intended for the reproduction of plants;</p> <p>“<b>Reference specimen</b>” means the smallest entity used by the breeder to maintain his variety, from which the representative sample for the registration of the variety is taken;</p>
<b>CHINA</b>	The new plant variety referred to in the Regulations means a cultivated plant variety, or a <i>developed one based on a discovered wild plant</i> , which is new, distinct, uniform and stable, and whose denomination is adequately designated .
<b>CROATIA</b>	<b>Variety</b> : A plant grouping within a single botanical taxon of the lowest known rank defined by the expression of a characteristic resulting from a given genotype or combination of genotypes and considered as a unit with regard to its suitability for being propagated unchanged.
<b>DENMARK</b>	A variety of cultivated plant may be protected as a plant novelty if it belongs to a species or genus for which the Minister for Agriculture has specified that this Act shall apply to it,
<b>FRANCE</b>	“ <b>New plant variety</b> ” ( <i>obtention végétale</i> ) shall mean any new plant variety, <b>whether created or discovered</b> , which is different from similar already known varieties by one characteristic that is important, precise and subject to little fluctuation or by several characteristics the combination of which is such as to give it the status of a new variety;

<b>IRELAND</b>	“ <b>variety</b> ” in relation to plants includes any clone, line, hybrid or genetic variant of any plant.
<b>ITALY</b>	<p>The variety shall be described in such a way as to make it clear <b>how it was obtained</b> and what the morphological or physiological characteristics are that distinguish it from other known similar varieties..</p> <p>The description may be supplemented with any information and documentation that is considered to be useful for the purposes of the examination of the application and with respect to the results of any growing tests that may have been carried out in Italy or abroad, particularly with respect to the homogeneity and stability of the characteristics</p>
<b>KENYA</b>	Plant variety means an assemblage of cultivated individuals which are distinguished by any character (morphological, cytological physiological, chemical or others) significant for the agriculture, horticulture or forestry and which when reproduced (sexually or asexually) retain their distinguished characters
<b>MOLDOVA</b>	<p>“<i>variety</i>” means a plant grouping created by selection, which grouping:</p> <ul style="list-style-type: none"> <li>– conforms to the criteria of patentability;</li> <li>– presents the characteristics of a given genotype or combination of genotypes;</li> <li>– can be distinguished from any other plant grouping of the same botanical taxon by the expression of at least one of the said characteristics;</li> <li>– may be represented by a single plant or plants, or by a single part or parts thereof provided that such part or parts may be used for the reproduction of entire plants of the variety;</li> </ul> <p>“<i>categories of a variety</i>” means clone, line, hybrid, population;</p> <p>“<i>material of a variety</i>” means whole plants, seeds, seedlings, bulbs or parts of plants intended for reproduction or for marketing for purposes other than reproduction of the variety;</p>

<b>MOROCCO</b>	<p>“<b>variety</b>” means a plant grouping within a single botanical taxon of the lowest known rank, which grouping irrespective of whether the conditions for the grant of a breeder’s rights are fully met and considered as a unit regards to its suitability for being propagated unchanged.</p> <p><b>Propagating material for the production of plants</b> means - reproductive material such as seed and fruit; vegetative propagating material such as plants or parts of plant, cuttings, tubers, bulbs, rhizomes.</p>
<b>NETHERLAND</b>	<p>“<b>Variety</b>” shall mean any group of plants belonging to a cultivated species that is regarded as an independent unit for cultivation purposes;</p> <p>“<b>Propagating material</b>” shall mean plants or parts thereof that are intended for cultivation by planting or sowing or by any other means;</p>
<b>NEWZEALAND</b>	<p>“<b>Plant</b>” --</p> <p style="padding-left: 40px;">(a) Includes a fungus; but (b) Does not include an alga or a bacterium:</p> <p>“<b>Protected variety</b>” means a variety in respect of which a grant is in force:</p> <p>“<b>Variety</b>” means a cultivar, or cultivated variety, of a plant, and includes any clone, hybrid, stock, or line, of a plant; but does not include a botanical variety of a plant</p>
<b>POLAND</b>	<p><b>Variety of cultivated plant</b>” (referred to as “<b>variety</b>”) shall mean a population of plants suitable for cultivation and characterized by its homogeneity and stability;</p> <p><b>Homogeneous variety</b>” shall mean a variety which, taking into account the particular features of its way of multiplication, satisfies the requirements concerning the variation of characteristics among individual plants;</p> <p><b>Stable variety</b>” shall mean a variety of which the essential characteristics remain unchanged after successive multiplication or at the end of each cycle of multiplication;</p>



<p><b>PORTUGAL</b></p>	<p>(a) "clone" means a group of individuals produced by vegetative propagation from a single plant that have an identical genetic heritage;</p> <p>(b) "line" means a natural or artificial sexually-reproduced group having sufficient uniformity;</p> <p>(c) "strain" means the offspring of plants of the same origin, produced by breeding and possessing numerous common characteristics;</p> <p>(d) "hybrid" means a plant resulting from spontaneous or induced crosses from parent material with a generally different genetic heritage;</p> <p>(e) "new plant variety" means any variety (cultivar), clone, line, strain or hybrid recognized as such from a technical or commercial point of view.</p>
<p><b>REPUBLIC OF BELARUS</b></p>	<p><b>Variety"</b> shall mean a group of plants which, irrespective of whether the conditions of patentability are fully met, can be defined by the expression of the characteristics resulting from a given genotype or combination of genotypes.</p> <p>The variety may be represented by a plant or by two or more plants, or by a part or by two or more parts of a plant, provided that the part or the parts in question may be used for reproduction of entire plants of the variety.</p>
<p><b>RUSSIAN FEDERATION</b></p>	<p><b>"variety"</b> means a plant grouping within a single botanical taxon, which grouping, irrespective of its protectability, can be defined by the expression of characteristics resulting from a given genotype or combination of genotypes;</p> <p>The variety may be represented by a single plant or plants as well as a part or parts thereof provided such part or parts may be used for the purpose of reproduction of entire plants of the variety; variety shall be deemed to comprise the following protected categories: clone, line, first generation hybrid, population;</p>
<p><b>SOUTH AFRICA</b></p>	<p>A variety of a kind of plant referred to in regulation 2 shall be deemed to be a new variety if-</p> <p>(a) propagating material thereof has not at the time of the application for the relevant plant breeder's right and with the agreement of the breeder concerned.</p>

<b>SPAIN</b>	“plant variety” means any commercial variety (internationally known as a “cultivar”), clone, line, stock or hybrid that satisfies the conditions established in this Law.
<b>TRINIDAD &amp; TOBAGO</b>	Variety means a plant grouping within a single botanical taxon of the lowest known rank which grouping , irrespective of whether the conditions for the grant of a Breeder's Right are fully met can be defined by the expression of the characteristics resulting from a given genotype or combination of genotypes, distinguished from any other plant grouping by the expression of at least one haracteristic and considered as a unit with regard to the suitability of the plant grouping for being propagated unchanged.
<b>VENEZUELA</b>	<b>Variety</b> : Set of Cultivated botanical individuals that are distinguished by specific morphological,physiological, cytological, and chemical characteristics and can be perpetuated by reproduction, multiplication or propagation.
<b>USA</b>	<b>Basic Seed.</b> The term “basic seed” means the seed planted to produce certified or commercial seed.  <b>Variety.</b> The term “variety” means a plant grouping within a single botanical taxon of the lowest known rank, that, without regard to whether the conditions for plant variety protection are fully met, can be defined by the expression of the characteristics resulting from a given genotype or combination of genotypes, distinguished from any other plant grouping by the expression of at least one characteristic and considered as a unit with regard to the suitability of the plant grouping for being propagated unchanged. A variety may be represented by seed, transplants, plants, tubers, tissue culture plantlets, and other matter.
<b>UZBEKISTAN</b>	“ <i>variety</i> ” means a plant grouping within a single botanical taxon, which grouping can be defined by the expression of the characteristics which retain hereditary stability and result from a given genotype or combination of genotypes and can be distinguished from any other plant grouping of the same botanical taxon by the expression of at least one of the said characteristics.  Variety shall be deemed to comprise the following protected categories: clone, line, first generation hybrid, population.
<b>ZIMBABWE</b>	Variety means: A botanical variety , cultivar , breeding line or clone which is sufficiently Homogeneous , distinct , uniform and stable or a <b>hybrid</b> or a <b>multilane</b>

**ANNEXURE\_ III**  
**Special Features of Various Plant Variety Acts**

Country	Features
Australia	<p>A reference in this Act to breeding, in relation to a new plant variety, includes a reference to the discovery of a plant together with its use in selective propagation so as to enable the development of the new plant variety.</p> <p>definition of "variety " includes fungi and algae but not bacteria, bacteroides, viruses, virioides, bacterioids. Process does not include Development of a cell, tissue, plant part into the variety being protected and also growth of a plant into a plant of particular variety</p> <p style="text-align: center;"><u>Genetic Modification</u></p> <p>For the purposes of this Act, an organism may be treated as constituting a plant grouping within a single botanical taxon despite the fact that the genome of the plants in that plant grouping has been altered by the introduction of genetic material that is not from plants.</p> <p>The Minister may, if the Minister thinks it necessary, in the public interest, refer to the Plant Breeder's Rights Advisory Committee the question whether a grant of PBR that the Minister proposes to make, or an existing grant of PBR, should be subject to conditions.</p> <p>A person must not, in relation to propagating material of a plant variety in which PBR has been granted, intentionally or recklessly do any of the acts referred to in a paragraph of section 11 if such an act would, under section 53, infringe the PBR in the variety.</p> <p>Penalty: 500 penalty units.</p>
Chile	<p><b>Offences and Sanctions</b></p> <p>The following shall be punished with minor detention or imprisonment of the lowest degree and a fine of five to 50 monthly tax units, without prejudice to the seizure of any material of the variety in his possession:</p> <p>Any person who, knowing that it is protected, propagates a variety and engages in any act with a view to marketing reproductive material of the variety without the consent of the owner of the breeder's right or without the license referred to in Article 7.</p>

	<p>Any person who, without the consent of the owner of the breeder's right, repeatedly uses genetic material of a protected variety in order to produce a new variety shall be liable to the same sanction;</p> <p>Any person who, knowing that it is protected, offers the variety for sale, distributes, imports, exports or markets or handles it in any way or on any ground so as to make it available for use as reproductive material.</p> <p>Any person who within the subsequent five years repeats any of the offences provided for in this Article shall be liable to punishment with minor detention at the intermediate level and up to twice the amount of the fine previously imposed.</p> <p>Material of the variety seized shall remain at the disposal of the breeder.</p>
China	<p>According to Chapter II article 25 in the Patent Law of the People's Republic of China, no patent right shall be granted to animal and plant varieties. So new plant variety right shall be granted according to the Regulations of The People's Republic of China on The Protection of New Varieties of Plants.</p> <p>Even though no patent right granted by the Patent Law, patent right shall be granted to processes used in producing animal and plant varieties.</p> <p>The relationship with seed production: The Regulations on the Protection of New Varieties of Plants is to protect breeders' intellectual property rights. As regards seed production and marketing, it is stipulated in Chapter I article 5 of this Regulations:</p> <p>"The breeders in state owned research institutes did not have the right to sell seeds. But a new policy was issued by the Ministry of Agriculture several years ago, which stipulated that state owned research institutes have the right to propagate and market new crop varieties bred by such institutes and earnings from such business is to belong to these institutes.</p> <p>The new plant variety referred to in the Regulations means a cultivated plant variety, or a <i>developed one based on a discovered wild plant</i>, which is new, distinct, uniform and stable, and whose denomination is adequately designated The new plant variety referred to in these Regulations means a cultivated plant variety, or a <i>developed one based on a discovered wild plant</i>, which is new, distinct, uniform and stable, and whose denomination is adequately designated</p>

	<p><b>Article 7: Right of an individual vis a vis employer,</b>  In the case of job-related breeding accomplished by any person in undertaking tasks for the entity to which he belongs, or primarily by using the facilities of that entity, the right to file an application for variety rights in respect of the new plant variety shall belong to the entity in question; for breeding that is not job-related, the right to file such an application shall belong to the person accomplishing the breeding. Upon approval of the application, the variety rights shall belong to the applicant.</p> <p>For commissioned breeding or jointly-conducted breeding, the ownership of the variety rights shall be agreed upon by the parties in a contract; failing such an event, the variety rights shall belong to the entity or person commissioned to conduct or jointly conducting the breeding.</p>
China	<p><b>Penalty</b></p> <p>Where the protected variety is sold without using the denomination as used in its registration, the administrative departments of agriculture and forestry of the People's Governments at county level or above shall, in accordance with their respective competence, order a correction within a specified time limit, and may impose a fine not exceeding 1,000 yuan.</p>

Czechoslovakia	<p><b>The Share In The Financial Benefits Derived From The Commercial Exploitation Of The Variety Or The Breed</b></p> <p>(1) Financial benefits derived from the commercial exploitation of the variety or the breed and from the transfer of the Breeder's Certificate to a foreign person within the meaning of Article 7(3) of the Law (hereinafter referred to as "financial benefits") shall be understood as the totality of the financial revenues drawn in the respective calendar year:</p> <ul style="list-style-type: none"> <li>(a) from the sale of propagating material;</li> <li>(b) from the consent given to the commercial exploitation (license fees);</li> <li>(c) from the compensation from a compulsory license;</li> <li>(d) from the transfer of the Breeder's Certificate to a foreigner.</li> </ul> <p>(2) Revenues in the meaning of paragraph (1)(a) shall be understood:</p> <ul style="list-style-type: none"> <li>a) in the case of a variety: as the revenues drawn from the sale of seeds, planting materials, nursery products and plants and their parts to be used for further propagation;</li> <li>b) in the case of a breed: as the revenues drawn from the sale of breeding stock, embryos, ova and sperm to be used for further propagation.</li> </ul> <p><b><u>Article 4</u></b></p> <p>A Czechoslovak organization which is the owner of a Breeder's Certificate shall keep separate records of the financial benefits for each variety or breed.</p> <p><b><u>Article 5</u></b></p> <p>(1) A share of the financial benefits shall accrue to originators during the whole term of validity of the Breeder's Certificate, as from the beginning of the year in which the variety or the breed produces financial benefits for the first time after the granting of the Breeder's Certificate (Article 3 of the Law).</p> <p>(2) The shares of the financial benefits shall be paid directly to the originators and shall be excluded from the taxable income of the organization.</p>
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	<p><b><u>Article 6</u></b></p> <ol style="list-style-type: none"> <li>1) In the case of a variety, the value of the share of the financial benefits shall be established by reference to the plant species or genus to which the variety belongs and to the number of years of commercial exploitation; it shall be calculated on the basis of the percentages set out in the table in Annex 2 to this Decree.</li> <li>2) In the case of a breed, the value of the share of the financial benefits shall be set at 2%</li> <li>3) Up to a maximum of 200,000 Czechoslovak crowns.</li> </ol> <p><b><u>Article 7</u></b></p> <p>The share relating to any calendar year shall fall due three months after the end of the year in which the financial benefits have been made.</p> <p><b><u>Article 8</u></b></p> <p>Where the financial benefits or a part of such benefits have been made in a foreign currency, the originator shall be entitled to payment of his share of the financial benefits or of the said part in the said currency.</p>
Denmark	<ol style="list-style-type: none"> <li>1. A plant novelty may be used for the purpose of commercial propagation with a view to selling propagating material only with the permission of the variety owner, and only under the terms and conditions specified by him, including terms and conditions concerning payment of a royalty.</li> <li>2. Any person who propagates a plant novelty commercially with a view to selling propagating material, or sells propagating material thereof, shall give to the variety owner all information that is needed to compute and collect the royalty due to the latter.</li> <li>3. The Minister for Agriculture may prescribe by regulations that any person propagating plant novelties of specified species for commercial use in his own business shall pay a royalty to the variety owner.</li> </ol> <p>Any royalty collected during the period of application shall be deposited by the producer in a blocked account with a financial institution in favour of the variety owner. The amount shall be released if the variety is entered in the Register of Plant Novelties. Otherwise the deposited amount, including accrued interest, shall be repaid to the producer.</p>

Finland	<p><b>Claim to a Better Right</b></p> <p>If a person claims to the register authority that he has a better right to the variety than the applicant and the matter is in doubt, the authority shall invite him in an interim decision to institute an action in court within the period determined by the authority. If the claim is not filed within that period, the claim shall be disregarded in the consideration of the application, and that fact shall be mentioned in the interim decision.</p> <p>If the issue of a better right is under consideration by a court, the consideration of application may be postponed until the issue has been decided on a final basis.</p> <p><b>Compulsory Licenses</b></p> <p>If the reproductive or vegetative propagating material of a registered variety is not placed on the market under reasonable conditions and to a sufficient extent in view of the food economy or other public interest, a person who wishes to exploit the variety in Finland on a professional basis may <b>obtain a compulsory license</b> to do so, unless the owner of the variety has an acceptable reason for his actions. The compulsory license shall also include the right to receive a sufficient quantity of reproductive or vegetative propagating material of the variety from the owner of the variety.</p> <p>A person who infringes the breeders' rights or the provisions of Section 22 on the exploitation of the variety denomination, deliberately or negligently, shall be required to <b>pay damages</b> for the exploitation of the variety and to <b>compensate any other loss caused by the infringement</b>. If the negligence is slight, the amount of the damages may be adjusted.</p> <p>The amount of the fees referred to in this Law shall correspond to the total costs for the State of providing the services (cost price). However, the amount of the registration fee and the annual fee may be determined so that the total amount collected from these is estimated to correspond to the total costs incurred by the State in maintaining the register.</p>
France	<p>Any new plant variety may be the subject of a title called "new plant variety certificate" (<i>certificat d'obtention végétale</i>), which shall confer on its owner an exclusive right to produce, introduce into the territory to which this Law applies, sell or offer for sale all or part of the plant or any element for the reproduction or vegetative propagation of the variety or of varieties derived from it by hybridization where their reproduction requires the repeated use of the original variety.</p>



Under the conditions provided for in Article 39 below, the provisions of the preceding paragraph shall be applied progressively to the various plant species according to the evolution of scientific knowledge and of the means of verification. **The elements of the plant to which the breeder's right relates shall be determined at the same time for each such species.**

Any intentional violation of the rights of the owner of a new plant variety certificate, as defined in Article 3, shall constitute an offence punishable by a fine of from 2,000 to 15,000 francs. In the event of recidivism, a sentence of imprisonment of from two to six months may also be passed. Recidivism shall have occurred, within the meaning of this Article, when the accused has been convicted of the same offence during the five preceding years.

Any person improperly claiming ownership of a certificate or of an application for a new plant variety certificate shall be liable to a fine of from 2,000 to 5,000 francs. In the event of recidivism, the fine may be doubled. Recidivism shall have occurred, within the meaning of this Article, when the accused has been convicted of the same offence during the five preceding years.

### **Article 32**

Without prejudice, should circumstances dictate, to the heavier penalties provided for violations of State security, any person who has knowingly committed a breach of the prohibitions laid down in Articles 18 and 19 shall be liable to a fine of from 3,000 to 30,000 francs. Where such violation has effectively prejudiced national defence, a sentence of imprisonment of from one to five years may also be passed.

Any person improperly claiming ownership of a certificate or of an application for a new plant variety certificate shall be liable to a fine of from 2,000 to 5,000 francs. In the event of recidivism, the fine may be doubled. Recidivism shall have occurred, within the meaning of this Article, when the accused has been convicted of the same offence during the five preceding years.

Without prejudice, should circumstances dictate, to the heavier penalties provided for violations of State security, any person who has knowingly committed a breach of the prohibitions laid down in Articles 18 and 19 shall be liable to a fine of from 3,000 to 30,000 francs. Where such violation has effectively prejudiced national defence, a sentence of imprisonment of from one to five years may also be passed.

Ireland	<p>Where an ornamental plant or a part of such a plant is sold in the course of a business for use by the buyer for purposes other than propagation and such plant or part is used commercially by the buyer as propagating material, no provision of this Act shall be construed as not applying in relation to such buyer by reason only of the fact that the plant or part was so sold.</p> <p>If it is in the public interest that a particular plant variety specified by the person (the name of which variety stands for the time being entered in the register) has been distributed by a holder in a manner which is not in the public interest or that such a plant variety should be widely distributed, or that it is otherwise in the public interest so to do, the Controller shall grant to the person in the form of a licence any rights as respects that variety as may be granted by the relevant holder.</p>
Italy	<p>The <b>variety</b> shall be described in such a way as to make it clear <b>how it was obtained</b> and what the morphological or physiological characteristics are that distinguish it from other known similar varieties.</p>
Kenya	<p>The Minister has the powers to prevent the importation into Kenya of seeds which if used as reproductive material, will or may cause deterioration of domestic types of varieties of plants by cross-pollination, physical admixture or other means.</p>
Moldova	<p>Law on Plant Variety Protection shall <b>govern both the economic and the personal non-economic relations arising out of the creation, use and legal protection of plant varieties</b> and shall apply to botanical genera and species of plants the list of which shall be approved by the Government of the Republic of Moldova.</p> <p><u>Author of a Variety</u></p> <p>(1) A person whose creative work resulted in the breeding, discovery or improvement (hereinafter referred to as “breeding”) of a variety shall be recognized as the author (the breeder) thereof.</p> <p>(2) Where a new variety is the result of joint creative work of two or more breeders, all such breeders shall be recognized as joint authors thereof. The conditions for exercising the rights in the variety shall be determined by agreement between them.</p> <p>(3) The authorship of a variety shall be an inalienable personal right. That right shall enjoy protection of unlimited duration.</p> <p><u>Author of a Variety</u></p> <p>(1) A person whose <b>creative work resulted in the breeding, discovery or improvement</b> (hereinafter referred to as “breeding”) of a variety shall be recognized as the author (the breeder) thereof.</p>

(2) Where a new variety is the result of joint creative work of two or more breeders, all such breeders shall be recognized as joint authors thereof. The conditions for exercising the rights in the variety shall be determined by agreement between them.

(3) The authorship of a variety shall be an inalienable personal right. That right shall enjoy protection of unlimited duration.

**The person who has bred a new variety in the line of duty shall be entitled to be identified as author in conformity with Article 10 and shall have the right to an equitable remuneration. The amount of remuneration shall be determined on the basis of the profits derived from the use of the new variety during the term of the patent, as well as the economic value of the variety.**

The amount of remuneration shall be stipulated in a contract between the breeder and the employer or the patent owner and may not be less than 15% from any proceeds derived by the employer or the patent owner from the use of the new variety, including earnings derived from the sale of licenses.

**The remuneration shall be paid to the breeder by the employer or, where the employer is not the patent owner, by the employer and the patent owner jointly. Where the amount of remuneration has been found unreasonably inadequate in relation to the actual contribution by the breeder and the actual value of the variety, the amount of remuneration may be increased at the breeder's request. Where the employer fails to increase the remuneration, the dispute shall be referred to the courts.**

#### Promotion by the State of the Breeding and Use of Protected Varieties

**The State shall promote the breeding and use of new plant varieties. The methods and means for the promotion shall be defined in the relevant legislative acts.**

The Netherlands	<p>The testing institution shall supply annually the holder of a plant breeder's right in respect of a variety of an agricultural species, at his request, with a list of members who have produced propagating material of his variety, stating the quantities concerned, <b>and shall, if so requested, assist him in collecting the licence fees.</b></p> <p>The entitlement to a plant breeder's right shall accrue to the person in respect of whom there are good reasons to believe that he or his predecessor in title developed the new <b>variety by his own efforts.</b></p> <p>If a new variety has been <b>developed by a person who is employed by another person</b> or who works for another person otherwise than for wages and the nature of the work involves plant breeding activities with respect to the cultivated species to which the variety belongs, the entitlement to a plant breeder's right <b>shall accrue to the employer.</b></p> <p>In that event the person who has done the breeding work shall be entitled to a fair remuneration, unless such remuneration may be deemed to be included in the wages received by him or in the benefits enjoyed by him. Any stipulation in derogation from the provisions of paragraph (2) shall be null and void.</p>
New Zealand	<p>Every person who commits an offence against this Act shall be liable on summary conviction to a fine not exceeding \$1,000.</p>
Russian Federation	<p style="text-align: center;"><b><u>The Certificate of Authorship</u></b></p> <p>The certificate of authorship shall attest the authorship of a selection achievement and the entitlement of the author to remuneration to be paid by the patent owner for the use of the selection achievement.</p> <p>The State Commission shall issue a certificate of authorship to each author who is not the patent owner.</p> <p>A natural person whose creative work resulted in the breeding, development or discovery of a selection achievement shall be recognized as the author thereof.</p> <p>Any disputes arising from the authorship shall be referred to the courts.</p> <p style="text-align: center;"><b><u>Article 23</u></b></p> <p style="text-align: center;"><b><u>Remuneration to be Paid to the Author of a Selection Achievement who is not the Patent Owner</u></b></p> <p>The author of the selection achievement shall, for the life of the patent, be entitled to remuneration to be paid by the patent</p>

**owner for the use of the selection achievement bred, developed or discovered by him.** The amount of remuneration and the terms of the payment shall be stipulated in a contract between the patent owner and the author. The amount of remuneration shall not be less than 2 per cent of the annual proceeds derived by the patent owner from the use of the protected selection achievement, including the earnings derived from the sales of licenses.

Where a variety or breed is bred, developed or discovered by two or more authors, their shares of remuneration shall be determined by agreement between them.

The remuneration shall be paid to the author within six months after the end of each year in which the selection achievement is used.

If the remuneration is not paid on time, the patent owner shall pay the author, for each day's delay, a monetary penalty the amount of which shall be stipulated in the contract.

#### REGULATION BY THE STATE OF THE CREATION AND USE OF SELECTION ACHIEVEMENTS

##### Article 24

##### Promotion by the State of the Creation and Use of Selection Achievements

The State shall promote the creation and use of selection achievements and shall grant authors thereof and economic entities using such varieties and breeds tax advantages, favorable credit terms and other benefits under the legislation of the Russian Federation.

The breeding activities shall be of prior importance and shall be financed from the Republican budget of the Russian Federation.

**Any profits (proceeds), including foreign currency earnings derived by the patent owner and the licensees from the use of a protected selection achievement, shall be exempt from taxation for two years after the variety or breed has been authorized for use. For grapevines and ornamental, fruit and forest trees, including rootstocks thereof, the said period shall be five years.**

Profits (proceeds) gained by an organization financed from the State budget through the use of a selection achievement remain entirely at the disposal of the organization.

Spain	<ol style="list-style-type: none"> <li>1. Fraudulent offenses shall be punished with fines of between 20,000 and 100,000 pesetas; the expenses incurred in the verification of the fraud shall be borne by the offender and, where appropriate, the plant material giving rise to the fine shall be confiscated.</li> <li>2. Clandestine offenses shall be punished with fines of between 10,000 and 50,000 pesetas</li> <li>3. and by the confiscation of the merchandise.</li> <li>4. Offenses which are merely against the rules shall be punished with fines of between</li> <li>5. 1,000 and 25,000 pesetas.</li> </ol> <p>Fees for the Protection of Plant Varieties shall be payable. They shall be subject to the legislation contained in the Law of December 26, 1958, on Fees and Parafiscal Levies, the Consolidated Taxation Law of December 28, 1963, and the additional provisions under those Laws, and shall be governed by the provisions of this Law.</p> <p>For the purposes of the fees established in the aforementioned Section, the plant species or groups thereof which are subject to protection shall be divided into the following groups:</p> <ul style="list-style-type: none"> <li>- First group: cereals, oil seeds, lucerne, cotton, sugar and fodder beet, vetch, potato, pea, broad bean and French bean;</li> <li>- Second group: fruit trees, rose, carnation and strawberry;</li> <li>- Third group: lettuce, tomato, onion, melon, sainfoin, red clover and white clover;</li> <li>- Fourth group: the other species not included in the above-mentioned groups.</li> </ul>
Slovenia	Where the breeder is an employee of a legal person and mutual rights and obligations are settled by a contract, the entitlement to the acquisition shall be defined by the contract.
United Kingdom	<p><b>Civil liabilities of sellers of seeds</b></p> <ol style="list-style-type: none"> <li>1. If and so far as seeds regulations provide that a statutory statement shall constitute a statutory warranty for the purposes of this section, the statutory statement, when received by the purchaser, shall, notwithstanding any contract or notice to the contrary, have effect as a written warranty by the seller that the particulars contained in the statutory statement are correct.</li> </ol>

2. If and so far as seeds regulations apply this subsection to the particulars in a statutory statement and prescribe limits of variation in relation to those particulars, those particulars shall, for the purposes of any legal proceedings on a contract for the sale of the seeds to which the statutory statement relates, be deemed to be true except so far as there is a mis-statement in the statutory particulars which exceeds the limits of variation so prescribed.
3. If and so far as seeds regulations apply this subsection to the particulars in a statutory statement, the particulars in the statutory statement shall, for the purposes of any legal proceedings on a contract for the sale of the seeds to which the statutory statement relates, be deemed to be true unless it is made to appear on a test carried out at an official testing station, and made on a sample taken in the manner, and within the period, prescribed by seeds regulations, that the particulars were untrue.
4. Where a purchaser intends to obtain a test of seeds for the purposes of subsection (3) of this section, the seller of the seeds shall be given written notice of the purchaser's intention not more than the prescribed period after delivery to the purchaser of the seeds under the sale, and seeds regulations shall prescribe a procedure for taking a sample of seeds to be tested for the purposes of that subsection which will afford to the seller of the seeds or his agent an opportunity of being present when the sample is taken, and of obtaining part of the sample.
5. A contravention of seeds regulations shall not affect the validity of a contract for the sale of seeds, or the right to enforce such a contract.
6. In Scotland a contract for the sale of seeds may not be treated as repudiated by reason only of a breach of a written warranty having effect by virtue of subsection (1) of this section.

### **CONTROL OF IMPORTS AND PREVENTION OF CROSS-POLLINATION**

**Section 32** [repealed]

### **Section 33**

**Measures to prevent injurious cross-pollination affecting crops of seeds**

(1) This section shall have effect for the purpose of maintaining the purity of seed of any types and varieties of plants of any species of the genus *Allium*, *Beta* or *Brassica*.

	<p>(2) The Minister may by order bring this section into force in an area in any part of Great Britain in which persons are engaged in growing crops of seeds of any type or variety of plant mentioned in subsection (1) of this section if he is satisfied that in that area satisfactory arrangements (whether legally enforceable or not) have been made for locating such crops so as to isolate them from crops or plants which might cause injurious cross-pollination.</p> <p>(3) An order under this section-</p> <ul style="list-style-type: none"> <li>(a) shall be made after consultation with the persons responsible for the arrangements mentioned in subsection (2) of this section, and with persons representative of such other interests as appear to the Minister to be concerned, and</li> <li>(b) shall be made by statutory instrument and may be varied or revoked by a subsequent order so made.</li> </ul> <p>(4) An order under this section-</p> <ul style="list-style-type: none"> <li>(a) shall state which of the types and varieties of plants mentioned in subsection (1) of this section are protected by the order, and</li> <li>(b) shall specify the kinds of crops and plants which are to be controlled in the area to which the order relates, and</li> <li>(c) may relate to more than one area and, if so, may make different provision under paragraphs (a) and (b) of this subsection in respect of the different areas to which it relates; and in this section, in relation to an area to which an order under this section relates- <ul style="list-style-type: none"> <li>(i) "protected crop" means a crop of a type or variety of plant which is protected by the order in that area, being a crop grown for the purpose of producing seeds, and</li> <li>(ii) "controlled crops or plants" means crops, grown for any purpose, of the types or varieties of plants which are protected by the order in that area, and such additional kinds of crops or plants, whether grown or self-sown and whether of those or any other types or varieties, as may be specified in the order for the purposes of this definition in that area.</li> </ul> </li> </ul> <p>(5) If in an area where this section is in force controlled crops or plants are growing and, on an application made in accordance with Schedule 7 to this Act, the Minister is satisfied-</p> <ul style="list-style-type: none"> <li>(a) that they are causing or may cause injurious cross-pollination in a protected crop which is being grown in the area, and</li> </ul>
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- (b) in the case of controlled crops or plants which are not self-sown, that the person growing them did not give to the persons responsible for the arrangements mentioned in subsection (2) of this section such notice of his intention to grow those crops or plants to the flowering stage as would have enabled them to take any appropriate steps for altering the arrangements,

the Minister may serve a notice on the occupier of the land where the controlled crops or plants are growing requiring him to take such steps as may be specified in the notice for the purpose of preventing any of the controlled crops or plants from causing or continuing to cause injurious cross-pollination in the protected crop.

(6) If the person served with a notice under this section does not comply with any requirement in the notice, the Minister may enter and do what that person has failed to do or, if in the opinion of the Minister that would no longer serve the purpose for which the notice was served, may take such other action as appears to the Minister appropriate for that purpose; and where, when the default occurs, further obligations remain under the notice, the Minister may also take such action as appears to him appropriate to meet the purposes for which those further obligations were imposed.

The Minister may recover from the person on whom the notice was served a sum equal to the reasonable cost incurred by the Minister in taking any action under this subsection.

(7) Without prejudice to the power of proceeding under the last foregoing subsection, a person who unreasonably fails to comply with any requirement in a notice under this section shall be liable on summary conviction-

- (a) in the case of a first offence under this subsection, to a fine not exceeding twenty pounds, and
- (b) in the case of a second or subsequent offence under this subsection, to a fine not exceeding fifty pounds.

(8) A person duly authorised by the Minister may, on production if so required of his authority, at all reasonable hours enter on any land (but not into any dwelling house) in an area where this section is in force for the purpose of ascertaining whether controlled crops or plants are growing on the land or of inspecting and taking samples of any controlled crops or plants growing on the land.

	<p>(9) A notice under this section or Schedule 7 to this Act may be served by leaving it at, or sending it by post addressed to, the last known address of the person on whom it is to be served, and if it is not practicable after reasonable inquiry to ascertain his name and address, the notice may be served by addressing it to him as “the occupier” of the land and affixing it or a copy of it to some conspicuous object on the land.</p> <p>(10) A person who obstructs or impedes a person acting in the exercise of the powers conferred by subsection (6) or subsection (8) of this section shall be liable on summary conviction to a fine not exceeding twenty pounds.</p> <p>(11) In this section, and in the said Schedule-</p> <p>“the occupier” means, in the case of unoccupied land, the person entitled to occupy the land;  “protected crop” and “controlled crops or plants” have the meanings respectively assigned by subsection (4) of this section.</p>
Uzbekistan	<p style="text-align: center;"><b><u>Article 5.</u></b></p> <p style="text-align: center;"><b><u>The Owners of Selection Achievements Bred in the Line of Duty</u></b></p> <p>A selection achievement shall be deemed to have been bred in the line of duty if in breeding the selection achievement the breeder:</p> <ul style="list-style-type: none"> <li>- carried out duties entrusted to him by virtue of his position;</li> <li>- carried out specific duties entrusted to him for the purpose of breeding a selection achievement;</li> <li>- made use of material or financial means made available to him by the employer or a person who commissioned the selection achievement;</li> <li>- made use of knowledge and expertise, within specific competence of the employer organization, gained during the employment.</li> </ul> <p>Where the employer, within four months after having been notified by the author of the bred, developed or discovered selection achievement, has not filed an application with the Patent Office, has not assigned his right to file an application to another person or has failed to notify the author of his decision to keep the selection achievement secret, the author shall have the right to file an application and to be granted a patent in his own name. The employer shall in that case be entitled to use the selection achievement in his own manufacture, subject to the payment of compensation to the patent owner. The amount of the compensation shall be stipulated in a contract between the parties.</p>

Where the employer has taken a decision to keep the selection achievement secret, he shall be obliged to pay the author a commensurate remuneration. The amount of the remuneration shall be stipulated in a contract between the parties and shall not be less than the market value of an exclusive license.

Where the notion that a selection achievement has been bred, developed or discovered in the line of duty, is applicable only with regard to one or several breeders, the provisions of this Article shall only apply to such breeders, their employers or persons who commissioned the selection achievement.

The author of the new plant variety or animal breed, who is not the patent owner, shall be entitled to remuneration for the use or licensing thereof. The amount of remuneration and the terms of the payment shall be stipulated in a contract between the patent owner or his successor in title and the author.

The remuneration to the breeder (or breeders) shall be paid by the patent owner or his successor in title, for the life of the patent or certificate, unless otherwise provided in the contract on procedure and time limits for payment of remuneration for the use of the selection achievement. The remuneration shall be paid to the breeder (or breeders) within six months following the date of expiration of the year in which the use of the selection achievement started.

The certificate shall be granted for a selection achievement that satisfies the conditions of uniformity and stability and relates to botanical or zoological genera and species both protected and not protected in the Republic of Uzbekistan.

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<sup>2</sup> Author had made several suggestions listed here to two of the earlier Secretaries, Agriculture, Government of India, viz., Mr.Rajan and Mr.Pant at their request. CMA had recently made a presentation to senior officers of MOA including secretary Agriculture and several issues listed here were discussed and debated. Author has had the opportunity to go through the latest plant variety bill that has received cabinet approval. It has many unique provisions unavailable in plant variety bills of any other country. The comments based on a MOA document summarising the plant variety bill are presented in the next part.

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## BIBLIOGRAPHY

Correa, Carlos.M,1998, Access to plant genetic resources and intellectual property rights, AOCGFRA, available through web page

Geoff, Tansley, 1999, Trade, Intellectual Property, Food and Biodiversity-Key Issues and Options for the 1999 review of Article 27.3. (b) of the TRIPS Agreement. Quaker Peace and Service , London.

Gupta,Anil.K., 1991, Why does poverty persist in regions of high biodiversity? : A case for indigenous property right system, Paper invited for the International conference on Property Rights and Genetic Resources sponsored by IUCN, UNEP and ACTS at Kenya, June 10-16, 1991.

----- , 1991, (With Kirit K Patel and B.L.Patil) Conserving Diversity For Sustainable Development, The Case of Plants of Insecticidal and Veterinary Medicine Importance. Presented at Project Design Workshop on Genetic Resources for Sustainable Agriculture, convened by M.S.Swaminathan Research Foundation, Madras, November 22 - 23, 1991. IIMA Working Paper No.1003.

----- , 1991, Sustainability Through Biodiversity: Designing Crucible of Culture, Creativity and Conscience. Presented at International Conference on Biodiversity and Conservation held at Danish Parliament, Copenhagen, November 8, 1991. IIMA Working Paper No.1005.

----- , 1991, Biodiversity, Poverty and Intellectual Property Rights of Third World Peasants: A case for renegotiating global understanding, The paper is an invited contribution for the Project Design Workshop on Genetic Resources For Sustainable Agriculture, M S Swaminathan Research Foundation, Madras, Nov 22 - 23, 1991, published in "Biodiversity: Implications for Global Food Security" (Eds.M.S.Swaminathan, and S.Jana), MaC Millan, 1997, pp.236-256.

----- , 1993., Biotechnology and Intellectual Property Rights: Protecting the interests of third world farmers and scientists, IIMA Working paper No.1057., published in Commercialization of Biotechnologies for Agriculture and Aquaculture: Status and Constraints in India (eds., U.K.Srivastava, S.Chandrasekhar), New Delhi, Oxford & IBH Publishing Co.Pvt.Ltd., pp.31-56, 1993.

----- , 1993., Biotechnology and IPR: Third World Issues for Farmers and Scientists, published in Biotechnology Monographs: Focus on Third World Issues, Series 1, Number 1, May 1993

----- , 1995., Dilemma in Conservation of Biodiversity: Ethical, Equity and Moral Issues — a review, Prepared for a workshop of Pew Conservation Scholars on

---

Developing Ethical Guidelines for Accessing Biodiversity, Arizona, October, 1994, published under the title, "Ethical Dilemmas in Conservation of Biodiversity: Towards Developing Globally Acceptable Ethical Guidelines" in *Eubios Journal of Asian and International Bioethics* 5 (Japan), March 1995, pp.40-46

-----, 1996., Social and Ethical Dimensions of Ecological Economics, Key Note Paper invited presentation at the Conference, Down To Earth of International Society of Ecological Economics, Costa Rica, October, 1994, in Ed. Robert Constanza, Oleman Segura and Juan Martinez-Alier, *Getting Down To Earth: Practical Applications of Ecological Economics*, Washington DC: Island Press, 1996, 91-116

-----, 1995., Crossroads of Creativity: Building upon People's Knowledge, Background Paper for a Workshop organised for the Top Management of International Fund for Agricultural Development (IFAD), Rome, April, 1995

-----, 1998., Compensating Local Communities for Conserving Biodiversity: How Much, Who Will, How and When, 1995, and published as *Rewarding Local Communities for Conserving Biodiversity: The Case of the Honey Bee in Protection of Global Biodiversity: Converging Strategies* (Eds. Lakshman D. Guruswamy and Jeffrey A. McNeely) Durham and London: Duke University Press, pp.180-189, 1998.

-----, 1995., People's Knowledge for Survival: Grassroots Innovations for Sustainable Natural Resource Management, presented at the IFAD's International Conference on Hunger & Poverty in Brussels during November 16-23, 1995.

-----, 1995., Knowledge Centre: Building Upon What People Know, presented at the IFAD's International Conference on Hunger & Poverty in Brussels during November 16-23, 1995.

-----, 1996., Patents on Neem: Will They Deprive Indian Farmers of Their Right to Use it as a Pesticide, published in *Biotechnology Law Report*, Volume 15, Number 1, January-February 1996, pp.6-14.

-----, 1997., Farmers' Innovations for Sustainable Resource Management and Conservation of Biological Diversity, published in the proceedings of the International Symposium on Food Security & Innovations: Successes and Lessons Learned at University of Hohenheim (Eds. Franz Heidhues/Andrea Fadani), Frankfurt, Berlin: Peter Lang, pp.97-112, 1997.

-----, 1996., Rewarding Creativity for Conserving Diversity in Third World: Can IPR Regime Serve the Needs of Contemporary and Traditional Knowledge Experts and Communities in Third World? Paper presented in AIPPI Forum (Sep 10-14, 1996) on Ethical and Ecological Aspects of IPRs, Interlaken, Switzerland on 13 Sep, 1996, IIMA WP No.1339, November 1996.

---

----- , 1996., The Nature, Agriculture and Nurturing Societies: Learning from Those Who Care and Conserve: Honey Bee Experience, paper presented in the Annual Conference of CEDIA organised in Copenhagen, Denmark during 13 - 15 October, 1996 on the theme of "A World Market for Agronomists: Can a Starving and a Well-fed Communicate?"

----- , (With P.G.Vijaya Sherry Chand, Kirit K Patel, S.Murali Krishna) Contracts for 'Compensating' Creativity: Framework for Using Market and Non-Market Instruments for Rewarding Grassroots Creativity and Innovation, published as the proceedings of the conference, Forum Belem I, 'A Third Millennium for Humanity? The Search for Paths of Sustainable Development (Eds., Dietrich E.Leihner and Thomas A.Mitschein) under the title, "Contracts for 'Compensating' Creativity: Framework for Rewarding Grassroots Creativity and Innovation", Frankfurt, Berlin; Peter Lang, pp. 201-217.

----- , 1996., Roots of Creativity and Innovation in Indian Society: A Honey Bee Perspective; Lovraj Kumar Memorial Lecture delivered in Delhi on 30 August, 1996, organised by Society for Promotion of Wastelands development, Delhi.

----- , 1997., (With Kirit K Patel, et al) Participatory Research: Will the Koel Hatch the Crow's Eggs, paper presented in the International Seminar on Participatory Research and Gender Analysis for Technology Development, organised by CIAT, Colombia, 1996; Published in New Frontiers in Participatory Research and Gender Analysis, as proceedings of the Conference, 1997, pp.209-243.

----- , 1997., Technologies, Institutions and Incentives for Conservation of Biodiversity in Non-OECD Countries: Assessing Needs for Technical Co-operation, presented at OECD Conference on Biodiversity Conservation Incentive Measures in Cairns, Australia, March 25-29, 1996, published in the proceedings, "Investing In Biological Diversity:The Cairns Conference", Paris: OECD,1997, pp.305-329.

----- , 1996., Indigenous knowledge, Conservation and utilisation of Animal Germplasm, Paper prepared for FAO's Strategy for conservation of global animal germplasm, 1996, Paper Prepared for Expert Group consultation for Global Animal Diversity Conservation, FAO, Rome

----- , 1997., Building Upon What Poor are Rich in: Honey Bee Network Linking Grassroots Innovations, Enterprise, Investments and Institutions, paper presented at the 22nd World Conference on "Which Globalization: Opening Spaces for Civic Engagement" in Santiago de Copmpostela, Spain, May 21-24, 1997, and published as "The Honey Bee Network: Linking Knowledge-rich Grassroots Innovations" in Development, Vol.40, No.4 (1997), pp.36-40.

----- , 1977., Enigma of Intellectual Property Rights: How long shall we miss the opportunities?, Invited paper presented at the 49th Indian Pharmaceutical Congress, Trivandrum Dec 20, 1977

---

----- , 1997., Institutional Pathways for Sustainability: A note for discussion, presented at Forum 97: New Linkages in Conservation and Development in Istanbul, Turkey, November 16-19, 1997.

----- , 1998., Intellectual Property Rights of Grassroots Innovators: Issues and Concerns, presented at National Seminar on "Biodiversity Conservation: Challenges and Opportunities" held at Forest Research Institute, Dehra Dun on October 10, 1998.

----- , 1992., Ethics of Foreign aid: Why is it always ignored?, published in "Criteria for Foreign Aid" (Ed.Frads Dolberg), Aarhus: The Development Research Working Group, University of Aarhus, Denmark, 1992, pp.30-50.

----- , 1996., Accessing Biological Diversity and Associative Knowledge System: Can Ethics Influence Equity?, IIMA WP No.1340, November 1996

----- , 1995., Ethical Guidelines for Accessing and Exploring Biodiversity presented in the Global Biodiversity Forum, Jakarta, 4-5 November 1995.

----- , 1998., Business Incubation Development in India, paper presented at the International Conference on Business Incubation in Hong Kong, November 18-20, 1998

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Ravishankar A ,1999, Searching for Policy Options: Is CoFaB a Suitable Alternative To UPOV, National Centre For Agricultural economics and Policy Research, NewDelhi

UNDP, 1999, New Technologies & the Global Race for Knowledge, London: Oxford University Press