BIODIVERSITY AND INTELLECTUAL PROPERTY RIGHTS

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SUMARIO: I. Genetic Resources and Intellectual Property; II. Mandate of the Biodiversity Convention; III. Biodiversity Convention: A Directive for the Protection of Intellectual Property Rights; IV. Conclusion

The Convention on Biological Diversity (CBD) 1992 and the Agreement on trade-related intellectual property rights (TRIPs) 1993 as a part of WTO are in force and are legally binding instruments on the parties thereto [1]. Whereas the main objective of the TRIPs is to recognise and protect monopolistic and private intellectual property rights (IPRs) held mainly by multinational corporations (MNCs), the CBD aims to conserve, sustainably use and share benefits of biological resources arising out of such use equitably in which the developing countries are the main holders. The TRIPs looks at individual rights while the CBD aims to encourage recognition of collective rights of communities.

The CBD was adopted in the background of increased threat to the genetic resources of the world by the new developments in biotechnology,[2] particularly rDNA technology (recombinant

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1 The CBD entered into force on Dec. 29, 1993 and has been ratified by more than 160 countries; TRIPS is binding on 130 countries.

2 In simple terms, biotechnology is understand to be a technology that uses, or causes organic changes in animals, plants, micro-organisms and any biological material, and also changes in the inorganic material by biological means. It is defined as the «application of scientific and engineering principles to the processing of materials by biological agents to provide goods and services», see Bull, Holt and Lily, *Biotechnology : International Trends and Perspectives* (OECD : 1992), p. 21.

deoxyribonucleic acid) [3]. However, immediately after its adoption, it raised a serious controversy in the developed world for its alleged negative impact on the further research and development (R&D). The United States has so far failed to ratify it [4] for its failure to protect adequately the interest of technology holders. This has cast a shadow on the enforceability of the Convention and the attainment of its objectives. Despite the position taken by the CBD that IPRs must not conflict with the conservation and sustainable use of biodiversity (Art. 16.5) and States should cooperate to ensure that IPRs should be supportive of and do not run counter to the objectives of CBD, conflicts are bound to arise.

The interface between the CBD and the IPRs is well recognised by the Second Conference of parties to the CBD [5], which, by its decision II/12 requested the Secretariat to :

- undertake a preliminary study which analyses the impact of IPR systems on the conservation and sustainable use of biological diversity and equitable sharing of benefits derived from its use;

- liase with the Secretariat of the World Trade Organisation (WTO) to inform it of the goals and the ongoing work of the CBD;

- invite the Secretariat of the WTO to assist in preparing a paper for the Conference of Parties (COP) that identifies the synergies and relationship between the objectives of the CBD and the TRIPS agreement.

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[3] rDNA technology modifies the genetic code of living organisms, i.e., micro-organisms, plants and animals and by so doing, new species of plants and animals are created. The end result is a genetically modified or manipulated orgnism (GMO). This process is much more advanced and faster than the traditional techniques of breeding plants and animals, see M.Roberts, *«A Consumer View of Biotechnology»*, 4 Consumer Policy Review, p.99 (April 1994).

[4] It was signed only in June 1993 by the Clinton administration

[5] *Intellectual Property Rights*, Decision II/12, UNEP/CBD/COP/2, adopted at the Second Meeting of the Conference of the Parties to the Convention on Biological Diversity, Jakarta, Indonesia, November 6-17, 1995.

The decisions at the Third Conference of Parties carry forward the concerns reflected at COP2 on the inter-linkages between IPR issues and trade liberalisation on the one hand, and the objectives of the CBD on the other:

- Decision L 18 of the Third Conference of Parties [6] draws attention to the need for conducting case studies of the impacts of IPRs on the achievement of CBD's objectives, including relationships between IPRs and the knowledge, practices and innovations of indigenous and local communities relevant to the conservation and sustainable use of biodiversity. It further recognises the need for work required to develop a common appreciation of the relationship between IPRs and the TRIPs agreement and CBD, in particular on technology transfer and on the three-fold objectives of the CBD, viz, conservation and sustainable use of biodiversity and the equitable sharing of benefits arising from such use.

- Decision L 12 further states that the WTO through the Committee on Trade and Environment (CTE), should consider a better appreciation of the relationship between trade and agricultural biodiversity, and collaborate with CBD [7].

- Decision L 8 emphasises on the need for co-operation between the CBD process and the WTO with regard to the inter-linkages between Article 15 on access to genetic resources and the TRIPS agreement [8].

Keeping in view these decisions, this paper examines the genesis of the controversy between IPRs and CBD and prospects of its resolution. For this purpose, the controversial provisions of the CBD and

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[6] *Intellectual Property Rights*, UNEP/CBD/COP/3/L 18, adopted at the third meeting of the Conference of Parties to the Convention on Biological Diversity, Buenos Aires, Argentina, November 4-15, 1996.

[7] *Agricultural Biological Diversity*, UNEP/CBD/COP/3/L 12. An earlier alternative text on the same subject was stronger in its mandate and stated that the CBD Secretariat was to conduct a study on the impact of trade liberalisation on agricultural biodiversity.

[8] *Access to Genetic Resources*, UNEP/CBD/COP/3/L 8.

their interface with IPRs will be examined. This necessitates to take a brief account of what genetic resources and biodiversity have in common with intellectual property, its protection, and modern technology in general.

Genetic Resources and Intellectual Property

The CBD is aimed at safeguarding the biological diversity [9] of the Earth which is primarily concentrated in the tropics, i.e., developing countries. It is a well-established fact that developing countries are rich in world's flora and fauna and 80 percent of the earth's terrestrial biodiversity is confined to these countries [10], which is the «raw material» for biotechnology, i.e., genes, folk varieties, land races to develop new varieties by biotechnology. Until the advent of molecular biology and genetic engineering , plant breeding depended for its success on access to genetic variability within a species. Genetic engineering has, however, rendered the transfer of genes across sexual barriers possible and has thus enhanced the economic value of biodiversity.

The R&D in biotechnology is principally confined to developed countries, particularly in private hands (mainly with MNCs). For their R&D, they generally fall back on the genetic resources provided by developing countries, which were available to them free of charge till recently from the farmers and plant breeders from developing countries. The products or plant varieties, particularly created or developed from these genetic resources are protected through patents and plant breeders' rights (PBRs) in developed countries are not freely accessible to developing countries. The protected products will be

[9] Biodiversity is normally classified under 3 major categories : ecosystem diversity, representing the principal biogeographic regions and habitats; species diversity, representing variability at the level of families, genera and species ; and *genetic diversity*, representing the large amount of variability occurring within a species. The CBD covers all these.

[10] India has over 45,000 species of plants, among them 15,000 belong to the category of flowering plants. About 300 of them are grown for a variety of purposes, including veterinary and human medicine.

exported to them at high prices, after «value-adding» without acknowledging the source or repaying their dues for cultivation and protection of this «raw material». For example, cancer like Hodgkin's disease and pediatric lymphocyte leukemia could be cured by vinblastine and vineristine, two alkaloids derived from the rosy periwinkle. Since their introduction in the early 1960's, these plant derived pharmaceuticals have been primarily responsible for improving Hodgkin's disease remission rates remarkably. Eli Lily, the corporate producer of these pharmaceuticals earns roughly more than US $ 100 million each year from these drugs, while Madagascar, the original home of rosy periwinkle, earns nothing from them. Today pharmaceuticals derived in some way from naturally occurring compounds (mainly from developing countries) account for sales estimated at US $ 20 billion in the US and well-over $ 30 billion worldwide.

That is why there is a direct interface between biodiversity and biotechnology: the enormous potential for improving human health while at the same time utilizing our biological diversity in an economically beneficial and environmentally responsible manner. It is important to note that genetic resources are store of knowledge. As «genotypes», i.e., information embodied in the genetic constitution of plant and animals, they become the subject matter of patents and PBRs, since they can possess exclusivity, even though their patentability is questionable *per se* on the grounds of novelty and disclosure. These developments have made the genetic resources potentially a prolific source of IPRs, which the TRIPs takes into account.

The TRIPs Agreement enjoins its members to grant patents «for any inventions ... in all fields of technology» (Art. 27) which covers biotechnology. Because of this biodiversity falls firmly under the legal regime of the TRIPs. But Arts 27(2) and 27(3) provide important exceptions in favour of protecting environment and thereby the biodiversity.

Art. 27(2) allows exclusion from patentability inventions, the prevention of whose commercial exploitation is necessary to avoid

serious prejudice to the environment. There are, therefore, two preconditions to exclude inventions from patentability, viz., (i) commercial exploitation of the invention should be disallowed; (ii) such prevention of commercial exploitation is necessary for the purpose of avoiding serious prejudice to the environment. However, such exclusion should not be «made merely because the exploitation is prohibited by domestic law». This implies that the WTO would have the authority to examine, interpret and decide what would constitute serious prejudice to the environment.

Members are also allowed to exclude from patentability «plants and animals other than micro-organisms, and essentially biological processes for the production of plants or animals other than non-biological 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» (Art. 27(3) (b)). Thus, the micro-organisms, or non-biological and micro-biological processes for the production of plants and animals are subject of patentability[11]. The plant varieties have to be effectively protected either by patents or sui generis system, or the combination of both. The bottom-line of this protection is exclusivity and monopoly.

One model of plant variety protection followed in the developed world, is provided under the International Union for the Protection of New Varieties of Plants (UPOV Convention) [12]. The standards laid down in the UPOV Convention are very much equivalent to patent protection, but TRIPs does not stipulate that members should adopt the UPOV model for their *sui generis* system. Nevertheless, TRIPs

[11] In U.S., GMO was granted patent in 1980, see *In re Dimond v. Chakraborty* (16 June 1980), 206 USPQ 193. The US Patent office granted first patent on transgenic animal to *Leder et. al*. on April 12, 1988. The European patent office (EPO) granted patent in the *Harvard Onco-Mouse case* (April 3, 1992), see the Technical Board of Appeal of the EPO's decision, 1990, OJEPO 476.

[12] The Convention which has 24 states parties, has been amended in 1972, 1978 and 1991. Its 1978 Act coming to close in April 1999, after the 1991 Act comes into force.

does not give the choice to the countries to have non-monopolistic model of protection for plant varieties. Any *sui generis* system proposed will be open to review by the WTO to decide whether or not this is *effective*. The whole provision on plant varieties is to be reviewed in 1999.

These developments at the international level have brought to the centre-stage the conflict between the holders of the genetic resources and the holders of biotechnology, which holds great potentials for the economic growth of the developing countries. The areas which are profoundly affected by biotechnology, particularly through rDNA technology, are medicine and agriculture, both of which are very critical for developing countries.

In the agriculture sector, rDNA technology can create disease resistant crops which reduce the use of chemical pesticides dangerous to soil and river and river life, produces varieties that can grow on agriculturally hostile grounds with high growth rate or size, greater crop uniformity and increased capabilities in nitrogen fixation, in photosynthetic-capabilities and in stress tolerance. Thus, the potential offered through biotechnology to produce new varieties for developing countries is significant, particularly where agricultural growth performance is poor and population growth rate is high, putting increased pressure on arable land to feed increasing number of people, increases in food crop yields assume added significance.

But the new high yielding varieties are more susceptible to diseases [13] and need greater inputs of pesticides and fertilizers. They also result in the extinction of existing plant genetic variety as farmers tend to use the new varieties at the cost of neglecting the traditional

[13] For instance, in Brazil, internationally developed new high yielding varieties led to the devastation of wheat crop in 1972 when it was exposed to a disease; and in 1975, Indonesian farmers lost 500,000 acre of rice to leaf-hooper insects for similar reasons, see UNCTC, *Transnational Corporations in Biotechnology*, DOC. ST/CTC/61 (UN, 1988), p.82.

one, leading to the depletion of the biodiversity of the planet and the genetic base of the crops and animals. It is, however, argued that rDNA technology brings into being new combinations of genes, which add to the genetic diversity. The original germplasm remains unaffected and undepleted and continues to be available in the original state. Nevertheless, it cannot be denied that patenting thrives on mass production and harbours large markets. Patentees tend to ignore the existing varieties over the protected ones and thus endanger the biodiversity.

Mandate of the Biodiversity Convention

According to Article 1, there are three main objectives of the CBD: (i) conservation of biological diversity; (ii) sustainable use of the components of biological diversity; and (iii) fair and equitable sharing of benefits arising out of the utilization of genetic resources and appropriate transfer of relevant technology. Different provisions of the Convention gives effect to this mandate.

It is acknowledged in the Preamble that «conservation and sustainable use of biological diversity is of critical importance for meeting the food, health and other needs of the growing world population, for which purposes access to and sharing of both genetic resources and technologies are essential». This proclamation has clearly established a «nexus» between the «appropriate» access to genetic resources and «appropriate» transfer of technologies, including those subject to patents and other IPRs . This provision is a compromise attempt between the long-lasting controversy amongst developed and developing countries related to the access, exploitation and preservation of the world's genetic resources.

The Preamble proclaims, among others, that «States have sovereign rights over biological resources» (also Arts 3 and 15) and they are responsible «for conserving their biological diversity and for using their biological resources in sustainable manner.»

In furtherance of this sovereign right, Article 15 provides that the «authority to determine access to genetic resources rests with the national governments and is subject to national legislation» (para 1). This makes the genetic resources subject to ownership of the State. Genetic resources are no more the «common heritage of mankind» as was declared in Article 1 of the International Understanding on Plant Genetic Resources adopted under the auspices of the FAO in 1983, the consequence of which in the past had been the free-of-charge use of genetic resources by all [14].

«Prior and informed consent» of states is a pre-requisite for access to these genetic resources (Art. 15 (1) and (5)). This provision, however, has raised concern over access to agricultural research centres of the Consultative Group on International Agricultural Research Work (CGIR). There are about 600,000 plant samples stored in the «geno-plasmin» banks of these centres. Now to have an access to these plant genetic resources would need the express permission of the countries of origin of all their materials before these centres would be able to distribute them. Moreover, there will be administrative obstacles and financial difficulties in managing these centres.

On the other hand, Article 15(2) requires that «Each Contracting Party shall endeavour to create conditions to facilitate access to genetic resources for environmentally sound uses by other Contracting Parties and not to impose restrictions that run counter to the objectives of this Convention.» Access to genetic resources of a Contracting Party «shall be on mutually agreed terms» (Art. 15(4)). The country providing genetic resources is entitled to benefit from the commercial use of its genetic resources (Art. 15 (6). Such sharing is based upon mutually agreed terms (para 7). On the other hand, States do no enjoy this sovereignty on IPRs under the TRIPs which lays down the uniform standards for all members.

[14] See Joseph Straus, *«The Rio Biodiversity Convention and Intellectual Property»*, 24 IIC (5:1993), pp.602-615, at 609-610.

The access to genetic resources has been subjected to the obligations laid down in Article 16, which provides :

> « Each Contracting Party, recognising that technology includes biotechnology and the both access to/and transfer of technology among Contracting Parties are essential elements for the attainment of the objectives of this Convention, undertakes subject to the provisions of this Article to provide and/or facilitate access for and transfer to other Contracting Parties of technologies that are relevant to the conservation and sustainable use of biological diversity or *make use of genetic resources and do not cause significant damage to the environment*» (para 1, emphasis added).

This provision is of considerable extent and has significant relevance for the IPRs.

Access and transfer of technology to developing countries have to take place on fair and most favourable terms, including concessional and preferential terms. However, in the case of «*technology subject to patents and other intellectual property rights*, such access and transfer shall be provided on terms which recognise and are consistent with the adequate and effective protection of intellectual property rights» (para 2, emphasis added). Thus, it enjoins members to recognise proprietary rights in genetic based technology and protect them through patents or other measures so as to provide effective protection. However, a developing country which provides genetic resources should be given «access to and transfer of technology, [by a Contracting Party] which makes use of those resources, on mutually agreed terms, including technology protected by patents and other intellectual property rights» by taking legislative, administrative or policy measures (para 3). It, thus, establishes a *quid pro quo* arrangement between the access to genetic resources and the transfer of technology. This obligation extends to private sector also, which should facilitate «access to, joint development and transfer of technology» for the benefit of both governmental institutions and the private sector of developing countries (para 4).

As the patents and other intellectual property rights may influence the implementation of the Biodiversity Convention, there is the obligation of the Contracting Parties to cooperate in this regard, «subject to national legislation and *international law* in order to ensure that such rights are supportive of and do not run counter to its objectives» (para 5, emphasis added). The reference to international law on patents and other IPRs clearly includes the obligations contained in the TRIPs agreement which requires the members to grant patents in every field of technology, and plant varieties are to be protected either by patents or a sui generis system or combination of both (Art. 27 of the TRIPs). What is not clear that in case of a conflict between the two, which will get precedence since para 5 makes IPRs supportive to the objectives of the CBD. Further, Art. 22 provides that the CBD «shall not affect the rights and obligations of any Contracting Party deriving from any existing international agreement except where the exercise of those rights and obligation would cause a serious damage or threat to biological diversity. Both provisions together provide a strong case for CBD to prevail over the obligations under any other agreement, including TRIPs.

The Convention further obligates Contracting Parties «to take all practicable measures to promote and advance priority access on a fair and equitable basis by Contracting Parties, especially developing countries, to the results and the benefits arising from biotechnologies based upon genetic resources provided by those Contracting Parties. Such access shall be on mutually agreed terms» (Art. 19). Thus, those who develop the new plant or animal varieties, pharmaceuticals or chemicals, based on genetic resources are to share their profits with the owner of those resources on mutually agreed terms.

Most important, the Convention requires signatories to protect and promote the rights of communities, farmers and indigenous peoples vis-a-vis their biological resources and knowledge system (Arts. 8 and 10).

The Convention also imposes obligation for the conservation of biological diversity. It has to be carried out by identification, monitoring

(Art. 7) as well as in situ and ex situ conservation (Arts. 8 and 9) «as far as possible» and «as appropriate», thereby making the obligation very vague.

Biodiversity Convention : A Directive for the Protection of Intellectual Property Rights

The Biodiversity Convention, for the first time, provides mechanisms for the successful exploitation of the genetic resources as well as for an adequate reward for the access to those resources. But the laudable objectives of the Convention are not easily achievable. The Convention does not impose a duty on the States to allow access to their genetic resources or to part with their technological know-how unless there exists a *quid pro quo* arrangement *inter-se* between the parties. Furthermore, the Convention requires that technology subject to patent and other intellectual property rights shall be made available to the countries providing access to their genetic resources, if adequate and effective protection of that technology is assured. This clearly means that before developing countries are given an access to biotechnology, they will have to protect such technology through patents or other intellectual property rights. TRIPs Agreement also requires them to do so (Art. 27). Thus, both, the Biodiversity Convention and TRIPs agreement are mutually consistent and reinforcing on this point. But the sharing of the profits and access to technology on mutually agreed terms are the troubling spots.

The United States and the European countries are incensed with the provisions of the Convention and their industry is concerned that it will lead to an erosion of IPRs when they have to share technology on a quid pro quo basis. There are fears that because of the potential of biotechnology to solve their national problems of food and health, developing countries may introduce compulsory licenses related to biotechnology. In fact, Article 8 (1) of the TRIPs authorises its members, in formulating or amending their national laws and regulations to adopt measures necessary to protect public health and nutrition, and to promote the public interest in sectors of vital importance to their

socio-economic and technological developments, provided such measures should be consistent with other TRIPs provisions. A member is authorised to issue compulsory licenses in cases of public non-commercial use (Art. 31 (b)) or to remedy anti-competitive practices (Art.31 (k)). A member of the TRIPs agreement is further empowered to refuse to grant patent protection or plant variety protection if it endangers the environment (Art. 27 (2). Mutual sharing of genetic resources and transfer of technology is also perceived by the developed world as an interference in contractual relationship and an encroachment of proprietary know-how and technologies. Such measures by governments (of developing countries) are perceived as disincentives for potential foreign investment in their countries. These views held by developed countries make it amply clear that no technology is forthcoming to developing countries without its effective protection by these countries.

Perhaps the most important feature of the CBD is that it gives formal recognition to the central role that indigenous and local communities as well as women, play in biodiversity conservation through their traditional and sustainable practices and cultural knowledge systems, which runs counter to the monopolistic concept of the IPRs. This recognition must be translated by way of legislation into three major sets of tools: (1) positive rights for local communities, as key actors in the development and management of biological diversity; (2) funded programmes to support conservation and sustainable use at the local level; and (3) checks on IPRs in order that they promote, and do not run counter to, the objectives of the Convention. The proposed Biodiversity legislation of India has taken into account these aspects. Much of the discussion in the country is related to domination of MNCs in plant breeding and seed industry. What the CBD provides for is the granting of such positive benefits for the earlier, non-patented foundation on which patented innovation rest. This foundation may be in the form of information, such as the knowledge in India of use of neem leaves as pesticides in stored grain, or turmeric as an antiseptic. The foundation may be material over which a MNC built up a new variety or make a compound by working on that

knowledge and adding an element of novelty of trivial nature, and not giving any benefits or share to the people or a public funded agency, like Indian Council of Agricultural Research which helped in its conservation and development.

The administrative implementation of the concept of indigenous and local communities rights is beset with many problems because of the complex quantitative and qualitative dimensions of recognising the inventive and value-addition components of their contribution as well as the precise location from where the critical genes responsible for the distinctiveness of the new variety came. The procedures suggested under the national legal system have to be simple, direct and just both in terms of recognition and reward. It should also not create any unnecessary hurdles for the foreign patentee/plant breeder/researcher.

These important provisions of CBD recognising the sovereignty of the state over its biological resources and equitable sharing of the benefits with indigenous communities do not find any place in the IPR regime, so reform is needed in it to make it conducive to CBD. Nevertheless, sharing of profits on mutually agreed terms is the ultimate solution to salvage this situation. Cooperation, rather than confrontation, is the solution and is in accordance with the CBD. Currently, there are four major models for such a cooperation : 1. The National Cancer Institute (NCI) model; 2. The Shaman Pharmaceuticals model; 3. The INBio-Merck model ; and 4. The ICBG (International Cooperative Biodiversity Groups) model.

Before having a brief description of these models, it is important to note the economics of biodiversity prospecting. It costs around $ 231 million to develop a drug and patenting a biological invention in the US is about $ 80,000 and for world-wide rights, it is about US $ 250,000. Hence any enterprise putting up so much money, would like to recoup that through IPRs.

The model the NCI uses as to collect natural products throughout the world, ship them to their laboratories in the U.S. and utilize its

scientific infrastructure to analyse the natural products. The NCI, which is confined to anti-cancer and anti-AIDS activities, only promises to a source country in compensation a loose promise of sharing percentage of royalties if commercialization of a compound takes place and the training of 1 or 2 of the source country's scientists in its U.S. laboratories.

Like NCI, under Shaman Pharmaceuticals (a US company) model, raw natural materials are shipped to the US laboratories. Shaman will supposedly share a small percentage of its profits with source countries through its non-profit entity, the Healing Forest Conservancy. However, it has yet to disburse any money.

The INBio model goes one step ahead of the former models in that it does not ship raw materials to multinational pharmaceutical companies. INBio (Costa Rica's Institute of Biodiversity) extracts locally alkaloids from the host country's flora and fauna and ships those extracts to multinational pharmaceutical companies and to the National Cancer Institute. In 1961 INBio signed an agreement with Merck & Co., a corporation organized under the laws of the State of New Jersey, USA. In that agreement, Merck provided US $ 1 million, most of which is earmarked for the cost of collecting, identifying, and preparing the samples which will be shipped to the Merck laboratories in the United States. In addition, the agreement stipulated that INBio will receive a fraction of the royalties proportional to its contribution to the drug discovery process. This fraction is known to be somewhere between 1-3%. 50% of this fraction –or 0.5%-1.5%– will go to the conservation and management of Costa Rica's protected areas: As in the Shaman model, no royalties have yet been disbursed.

Under the ICBG model, extracts of raw samples will be shipped to US pharmaceutical companies for extended study and analysis. In exchange, the source country will receive an undisclosed royalty rate (between 1% - 3%) and some limited training for their scientists.

The problem with these models for biodiversity prospecting is that at least 97% of the «value adding» takes place in the developed nation (in this case, the US), which means 97% of risk and 97% profits end up there. If the developing countries want to benefit from and conserve their rich endowment of biological diversity, They will have to undertake greater percentage of the risk and performing more of the «value adding». What is needed is not to ship raw materials to the developed nations for value adding there, but to transfer technology to the developing countries to invest national funds in performing in value-adding. If they can perform the value-adding in their own countries, they will be able to dictate what an equitable compensation to indigenous people or rural communities should be, and thus will be able to conserve biodiversity by investing more on it.

It is also to be noted that biotechnology research is generally controlled by private sector where research results are kept very secret. It is also location-specific, particularly in the agriculture. It has to adapt itself to local soil and climatic conditions. An agreement with a foreign party should allow access to genetic resources in exchange for indigenous research and production facilities, and training the local manpower. Such an arrangement will mutually benefit by providing a mechanism for a successful exploitation of genetic resources in return for an adequate reward for access to those resources.

The Government in these countries should create a fund by placing a charge on the producers' surplus in proportion to the «proximity» of the patented or protected life form or folk varieties. The fund can be used to promote environmental causes in the developing world. The local R&D in biotechnology, particularly in agriculture for developing new varieties, need to be encouraged. Any misuse of the rights granted under the national laws should be subjected to compulsory licenses in order to safeguard the national interest.

It is often remarked that IPRs would negatively affect biological diversity since the farmers will grow more rewarding new varieties at the expense of land races and other species. The problem can be addressed in the context of the entire complexity of a given national

economy, administratively and legally. The States, through legislation may encourage a single species or a variety of species to counteract the excessive use of a single variety by providing adequate incentives, such as giving financial support or granting subsidies, or by prescribing a minimum percentage of agriculture land to be used for land races in addition to the new varieties, by giving incentives for in situ conservation of land races. The role of the village folks, including women, who for generations conserved and developed these land races, should be adequately reflected in the legislation. There should also be *ex situ* conservation measures (gene banks) undertaken by the governments at the national and international levels. The *in situ* maintenance of genetic resources requires maintaining plants in their original habitats, continuously followed by natural selection or by maintaining the plant's variability under controlled growing conditions (i.e. through germplasm growing centres) [15]. Such measures will help in avoiding the monocultures in agriculture and save the biodiversity.

CONCLUSION

All member states of CBD and TRIPs Agreement face an inescapable problem. Both treaties are legally binding but their obligations are quite at variance. It is likely that a country which in all goodfaith seeks to implement community rights and does not so through a CBD framed policy, could find itself in serious contravention of the TRIPs Agreement. Developed countries, and particularly MNCs, perceive that the Biodiversity Convention will only be functioning in a beneficial way for all Contracting Parties if IPRs will exist in biological and genetic material throughout the world, i.e., in developed as well as in developing countries. For sustainable development, a proper balance has to be struck between the intellectual property rights and the conservation of the biodiversity. However, in this period of liberalisation and globalisation of the economy and the R&D,

[15] See , for more on this point, M.S. Swaminathan, «*Draft Plant Varieties Recognition and Protection Act : Rationale and Structure*» in Ramanchandriah. (ed.) GATT Accord : India's Strategic Response (1994), pp. 189-243.

the access to technology is not possible without the protection of IPRs. With the conclusion of the TRIPs agreement, high standards of patent protection have come into existence. This will make it further difficult to have an access to new technology without first adhering to those standards under their national laws. The developing countries, however, can protect the new plant varieties developed through biotechnology by a sui generis system, consonant to their needs and which should be able to conserve and improve the biodiversity as necessary for sustainable development.

For this purpose, the new legislation should aim at protecting and conserving the land races, in situ and ex situ. There should be free access to new varieties for research purposes. The farmers and women, who help in conserving and developing the new plant varieties should be adequately encouraged. Their active involvement must be supported by the government. Since biotechnology research is area specific, the entrepreneurs, local and foreign, who are willing to undertake such research, should be encouraged for an adequate return. In its zeal to have access to new technology, governments should not ignore the land reces and farmers should be encouraged and obliged to protect them by making it mandatory to grow land races in a specific portion of their land. There should also be the provision for compulsory license, if the patent holder or PBR holder misuses his right.

The TRIPs provisions on PBRs are coming for review in 1999. In the context of CBD, any new dispensation to be decided should have the following lines of action :

(a) In the interest of biodiversity and to avoid conflict with IPRs, countries should recognise and affirm in law the privacy of the CBD over the WTO/TRIPs Agreement in the areas of biological resources and traditional knowledge systems. For the purpose, Arts. 16 (5) and 22 of the CBD must be clarified.
(b) The governments should be provided the option to exclude all life forms and related knowledge from IPR systems, and for this purpose Art. 27 (3) (a) of the TRIPs requires amendment.

(c) The collective rights of indigenous and local communities to freely use, exchange and develop bio-diversity should be recognised as a priori rights and be placed over and above private IPRs.

(d) To facilitate the realisation of the objectives of the CBD, such as that of equitable sharing of benefits, the TRIPs should mandatorily specify that norms of disclosure pertaining to an IPR application should reveal the country of origin and the community which provided the knowledge about the resources pertaining to the patentable subject matter, as well as proof of consent of such country. In other words, the applicant must satisfy the requirement that the provisions of the CBD have been fulfilled.